DIGITAL AUDIO MIXING SYSTEM

A·X·U·M

User Manual

Smart in Solutions

D&R Electronica Weesp BV
Rijnkade 15B
1382GS Weesp
The Netherlands
Phone: +31 (0)294-418014
Fax: +31 (0)294-416987
Website: http://www.d-r.nl
E-mail: info@d-r.nl

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Dear Customer,

Thank you for choosing the AXUM audio mixing system.

Specialists in the field of Radio/TV Broadcast and audio production designed the AXUM.
It is a system that is capable of working in a multitude of applications that need a
24-hour "On-Air"/Production system.

To be able to improve our products we always value suggestions once you have become familiar with your system. We will certainly learn from your comments and very much appreciate you dropping us a mail at info@d-r.nl

We are confident that you will be using the AXUM for many years to come, and wish you lots of success in your business.

And… please take some time to read this manual first to avoid unnecessary questions to yourself and to us.

With kind regards,

Duco de Rijk
President

D&R ELECTRONICA WEESP B.V.
Rijnkade 15B
1382 GS Weesp
The Netherlands

Phone: +31 294 418014
Fax: +31 294 416987
Website: http://www.d-r.nl/
E-mail: info@d-r.nl

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2 Package Contents

The AXUM package comes normally with the following parts inside:

- AXUM Getting started document
- AXUM System in the configuration you have ordered.
  - One or more 19” IO-Racks with the I/O, DSP and power supply cards.
  - Optional Control Surface(s) with external power supply.
  - Optional patch panels.
  - Optional RJ45 Shielded cables.
- AXUM user manual

WARNING: A network switch is not included but required to interconnection multiple system parts and a laptop/PC for configuration. You may use any Ethernet switch for this purpose!

3 Introduction

This manual will give you an overview of the functionality of the AXUM digital audio system and all its features. It is advisable to read this manual at least once before touching any control, or even thinking about hooking up the system. We know that this is actually the first thing you want to do, but please do not and discipline yourself to read the manual first.

The manual gives all sorts of valuable information before getting started and it saves you from getting all sorts of questions. After installing this manual can be used as a reference.

In the first chapter, we will give you an overview of the AXUM and its features. This way, you have an impression on how to implement the system in your application.

The next chapters will deal with interconnecting the various parts of the system and its external interfacing with your equipment

When installing and wiring the AXUM, you can finalize its interfacing with the instructions in the following chapters.

After installation, you will have a very complete mixer with a human interface that is very logical and intuitive.

4 System overview

The Axum is a digital modular audio system that can solve your digital mixing/routing requirements in your broadcast studio or in your complete broadcast facility. The modular system can be used in all your mixing/routing applications like on-air broadcast, self-op, production and voice tracking.

4.1 System parts

To make a functional mixing console you require at least a 19" rack with a DSP card (32 stereo channels), the desired I/O cards and a control surface that can control all the mixing power. The connection between the 19" rack(s) and control surface(s) rely on a network protocol that is been called MambaNet.
MambaNet works on Ethernet layer 2, there for no IP-addresses have to be setup for the 'real-time' functionality.

WARNING: Do not connect multiple AXUM engines/racks in the same Ethernet network (Layer 2)

To connect surface(s) and 19" rack(s) you can built on this known Ethernet standard with common switches till advanced managed switches with all the security solutions as there are STP (spanning tree protocol), Trunking etc.

For (remote) configuration the well known webbrowser is used to access the consoles webserver. Of course this happens on a IP-based level of communication, which makes it possible to configure system over the internet.

The defaults IP-addresses for configuration pages are:
http://192.168.0.200 for the configuration in main menu
http://192.168.0.23x for the controller surface configuration. (for the first surface set *x* to 4, for a second surface set x to 5, etc).

To prevent other people to access the Axum configuration pages you need to logon.
The default logon is:
Username: service
Password: service

This account may change, which is explained in chapter **Error! Reference source not found.Error! Reference source not found.** (**Error! Reference source not found.**).
Network specialists can find some more information in chapter 18 (Appendix A).

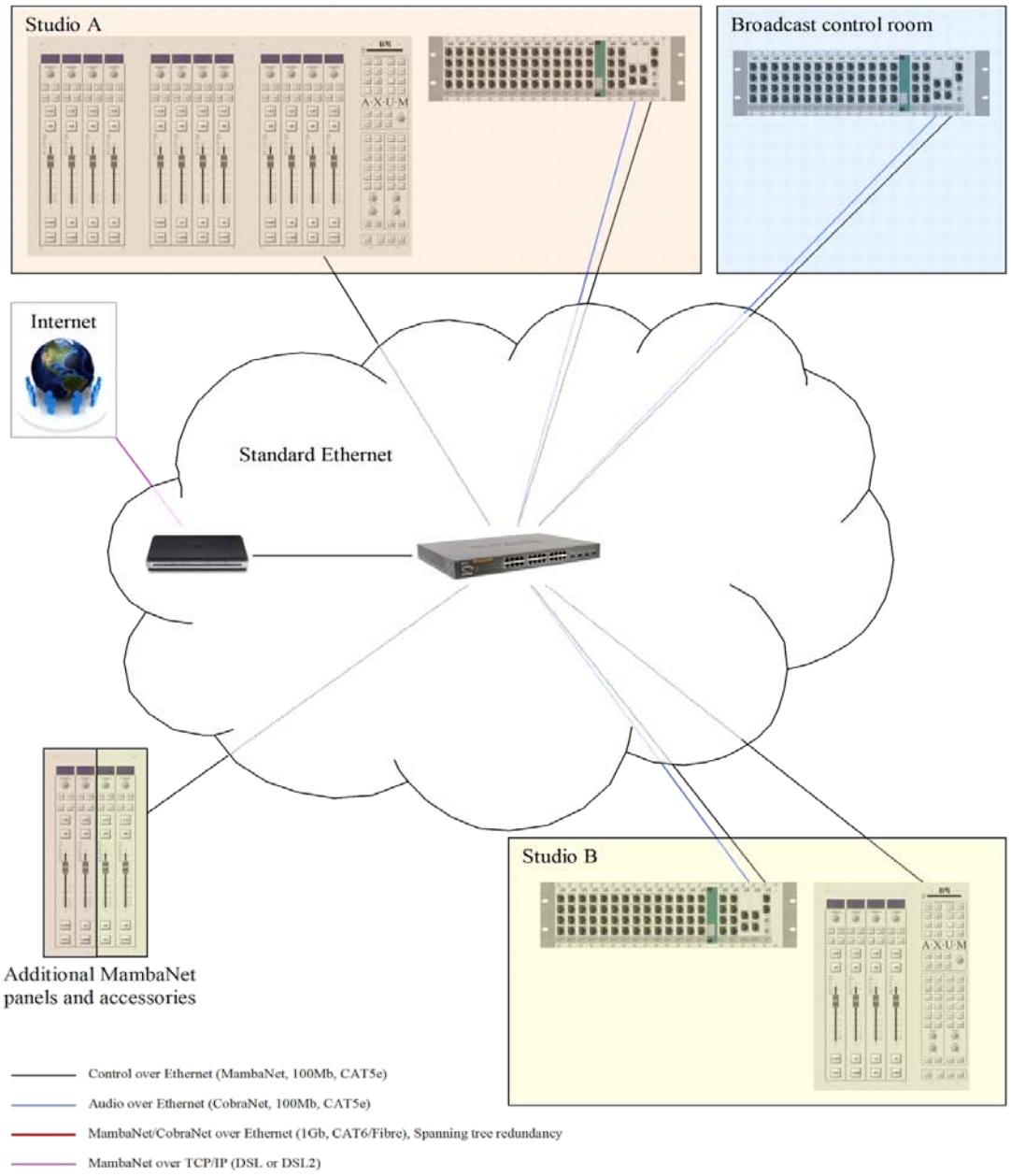


Figure 1: Basic system layout

4.2 Communication

All control communication takes place with MambaNet and gives the surface flexibility and power to the AXUM digital audio system. To understand the AXUM digital audio system it would help to know some principles of MambaNet.

MambaNet definitions:

- *Objects*
  A fader, switch will have to trigger an action in the AXUM digital audio system. In MambaNet, we call these faders and switches 'objects'.

- *Nodes*
  In the hardware the faders and switches are grouped on modular blocks (think of a single PCB), such blocks are represented as 'nodes' in MambaNet.

- *Engine*
  In the Axum digital system the engine is in fact your mixing console. The functions available in the 'engine' can connect to one or more objects found in your network.

In practice, this means you can connect any surface element like switches and faders to any function of your mixing console(s). From now on, you can design your own functionality at the control surface.

Information for manufacturers and developers is located at http://www.mambanet.org, it is possible to make your own communication with the mixing system; we have a MambaNet library available for Windows (DLL) and Linux (lib).
For professional developers it is possible to buy a Manufacture ID from D&R so you are able to make your own equipment compatible with the MambaNet protocol. Secondly, local radio stations can use manufacturer ID 0xFFFF for some custom implementations.
(All manufacturer IDs are unique except the 0xFFFF, which is free for 'in-house' implementation)

Figure 2: MambaNet logo

4.3 Features and highlights

Because the AXUM digital audio system is highly flexible, you can make many solutions for your mixing and routing. To have an overview on the power of the Axum digital audio system we made a list of the most important features and highlights:

- I/O Matrix of 1280x1280 with optional I/O Cards:
  - MIC inputs and GPIO's
  - Line inputs and GPIO's
  - Digital in/outputs and GPIO's
  - Line outputs and GPIO's
  - CRM/Phones outputs and GPIO's
  - ADAT in/outputs
  - CobraNet in/outputs
  - Firewire in/outputs
  - Hybrid in/outputs
- 32 stereo modules per DSP card.
  - Gain
  - Low cut
  - 6 band full parametric EQ
  - Voice processing
  - one free FX DSP for future use.
- 32 busses, default configured if:
  console 1 and 2 with each a:
  - Stereo Program buss
  - Stereo Sub buss
  - 4x Stereo Aux buss
  - Stereo Dump buss
  - Stereo PFL buss
- Up to 4 DSP cards
  - up to 128 stereo modules
  - up to 16 monitor busses.

  (for example it is possible to make 4 studios with one I/O rack, or even 2 studios of 16 stereo modules and 2 stereo monitor busses with a single DSP card in your I/O rack…)
- Advanced preset system.
- Object oriented control protocol, MambaNet
- Configuration of the AXUM nodes using one web server
- Multiple redundancy solutions
- Remote configuration via HTTP and TCP/IP
- Remote control via MambaNet over UDP/IP and TCP/IP
- Standardized cabling with RJ45 (shielded for audio connections)
- Advanced security system based
- User database for identification

4.4 Principle of operation

4.4.1 AXUM system

The AXUM system will be build up around the matrix/router that gives a lot of routing flexibility. Up to 4 DSP cards can be inserted to create mixing power as requested. For example, you can create with one AXUM system (equipped with one DSP card):

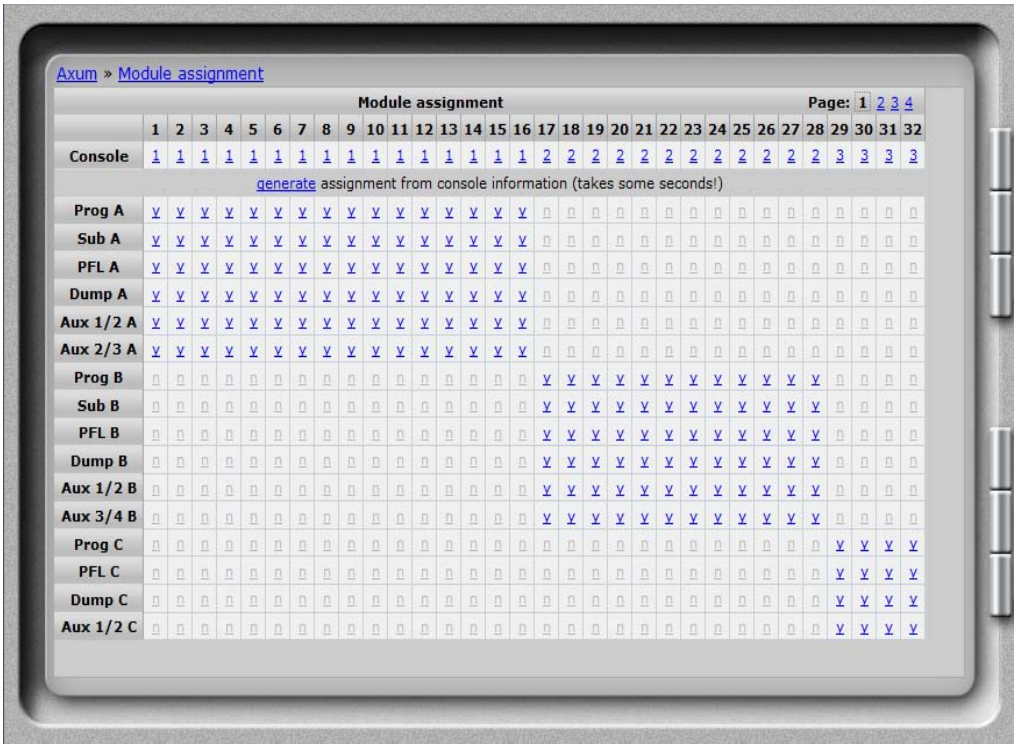
- A single mixing console with 32 stereo modules and 16 stereo busses
- Multiple mixing consoles (maximal 4), 3 consoles are used in our example:
  1 consoles with 16 stereo modules and 6 stereo busses
  1 consoles with 12 stereo modules and 6 stereo busses
  1 console 4 stereo modules and 4 stereo busses

This makes clear we do not talk over a 'mixing console', the AXUM is an audio-platform!
Depending on the configuration, you can make your own studio console(s)/surface functionality. Al this power is controlled and configured by the AXUM engine. This engine configuration is described in detail later on.

4.4.2 Mixing console

As mentioned before the configuration is done within the Axum engine, now we will give a short overview/introduction on the structure of the mixing console(s) platform solution of the engine.

For the configuration of the busses, monitor busses and modules you can setup to which console it should belong (1-4). Finally the engine will extract a 'assignment' picture from this information which shows clearly the console blocks.



4.4.2.1 Sources

Each module can receive audio from the matrix using so called ‘sources’. A source is given a name, left/right physical input and some additional settings (think of phantom, pad, redlight settings). For example if we make source ‘MIC1’ with phantom on we can route this to module 1 and/or module 13. So the MIC 1 is used at console 1 but also at console 2 (or 3).

4.4.2.2 Destinations

Audio is sent to physical outputs by so called ‘destinations’. A destinations given a name, left/right physical outputs and some additional settings (default audio-source, N-1 etc). For examples we make destinations ‘Line out 1’ and ‘Dig out 1’ which both get the audio from ‘Prog A’.

4.4.2.3 Console/Surface functionality

After the consoles are set-up/configured and the inputs and outputs are set-up with the correct settings of sources/destinations you can start using the console functionality. Which functionality is available depends on the configuration of the system.
It is important to make the required ‘real-time’ functionality available via the surface and rack configuration menu’s. Actually here you define the ‘knob functions’.

4.4.2.4 Console startup/Presets

At the console start up it will load the last backup or the programmed defaults, this depends on a setting in global configuration.

The programmed defaults are:
- The information set within the webbrowser pages
- For the modules ‘module preset 1A’ is selected by default.

Further in live use of the console(s) you can make use of presets:
- Processing presets
- Module presets
- Console presets

processing preset:
A processing preset contains module-settings (think of EQ, Dynamics etc. etc).
When a source is selected by the control surface encoder, the assigned default processing preset is loaded.

Module preset:
The module preset 1A t/m 4B defines a combination of: Source, Processing preset and Routing preset.
In this case if module preset 1B is recalled:
- The configured ‘preset 1B source’ is set on the module
- The corresponding processing preset is set on the module. Processing preset field that not override the module will set according to the module configuration settings (if ‘Use at source select’ is active).
- The routing as given by ‘module preset 1B’ is restored.

Console preset:
The console preset consists of two main parameters:
- It loads Module preset 1A, 1B, 2A, 2B, 3A, 3B, 4A or 4B.
- It loads a buss/monitor buss preset.

Here also you can define if a separate buss is used within the preset (the configuration setting ‘Use’ – Yes/No).

In general you can say:
- The console will startup in the defaults like given in the webpage.

- When a source is selected (can also be in the startup-defaults) the corresponding processing preset is loaded.
- When a module preset is loaded, the complete module settings can be preset.
- With the console preset you are able to change: module-settings , buss master en monitor buss settings.

5 Control Surfaces

The engine will recognize the control surfaces of the AXUM digital audio system as 'nodes with objects'. Each object can connect to an engine (mixing console) function.
Below you see an example of a control surface and a short description of the node/object structure.

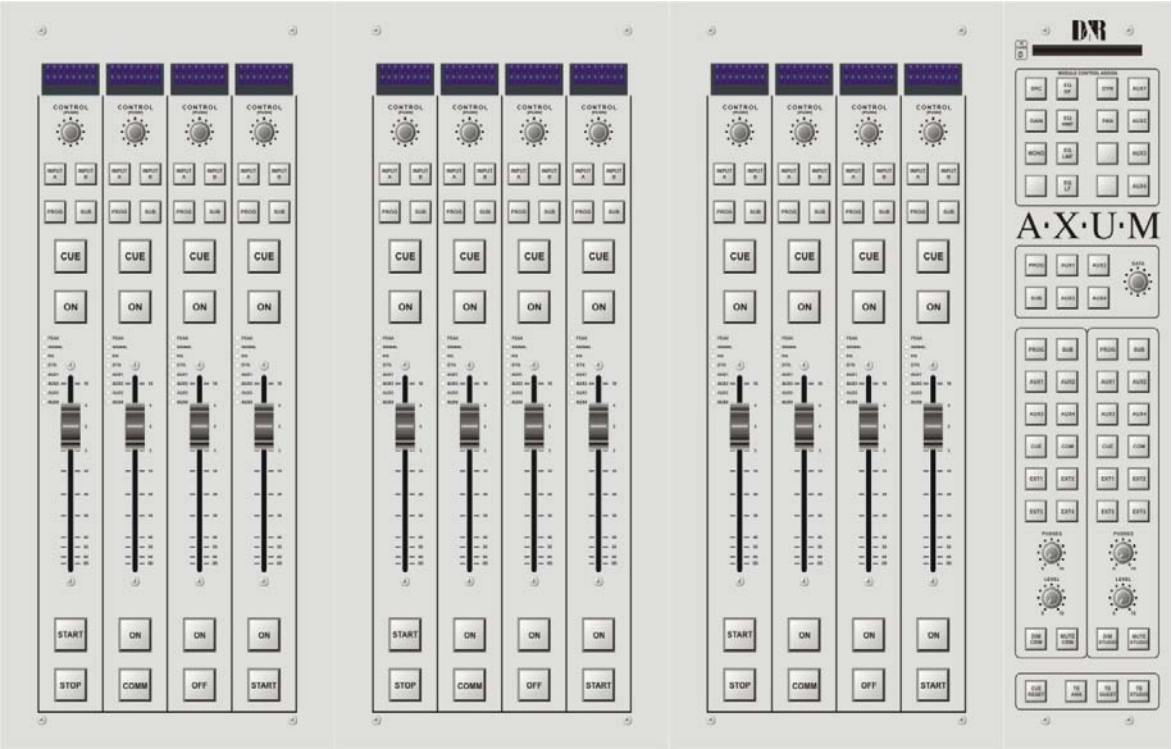


Figure 3: 12 fader control surface

This control surface holds 4 user interfaces nodes:
- 3x four fader panel node
- 1x monitor buss panel node

The 'four fader panel node' holds 84 objects:
- 4x Display upper line
- 4x Display lower line
- 4x Encoder
- 4x Encoder-push
- 32x LEDs
- 32x switches with LEDs (16 small, 16 large)
- 4x fader

The 'monitor buss panel node' holds 61 objects:
- 1 chip card
- 54 switches with LED's
- 1 encoder
- 1 encoder push
- 4 potentiometers

6 AXUM Engine

The engine of the Axum drives all audio processing/routing and from the surfaces and remote locations, it can be controlled using MambaNet. Therefore it is required that you setup the engine/system with your settings before it will work according your requirements. Of course, we deliver the system in a default configuration that will cover 90% of the functionality you wish.

Setting up the engine (your mixing console) is done using your web browser.
Simply enter the IP address of the 19" rack in your browser and log-on to the configuration pages.

By default the IP Address is: **http://192.168.0.200**
(at the first startup you can use a network or cross wire with a static IP given to your network interface, e.g. 192.168.0.10).

On the Axum website, you find all necessary options to configure your system as full functioning mixing console(s), it's the most to start with the Console 1-4 configuration. In this menu you may easy step from top to bottom.

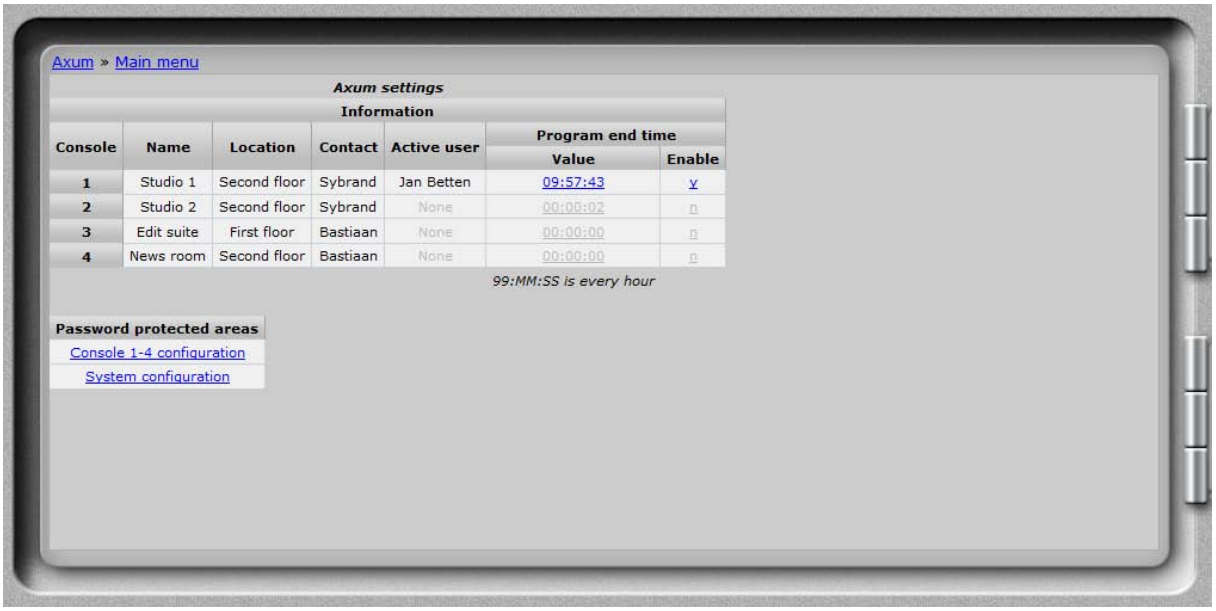


Figure 4: Axum web server

6.1 Console 1-4 configuration

This pages shows all configuration possibilities to setup your console 1-4. Your system is preconfigured but you may step through the menus for personal adjustments.

Figure 5: Console 1-4 configuration

6.1.1 IP/Clock configuration

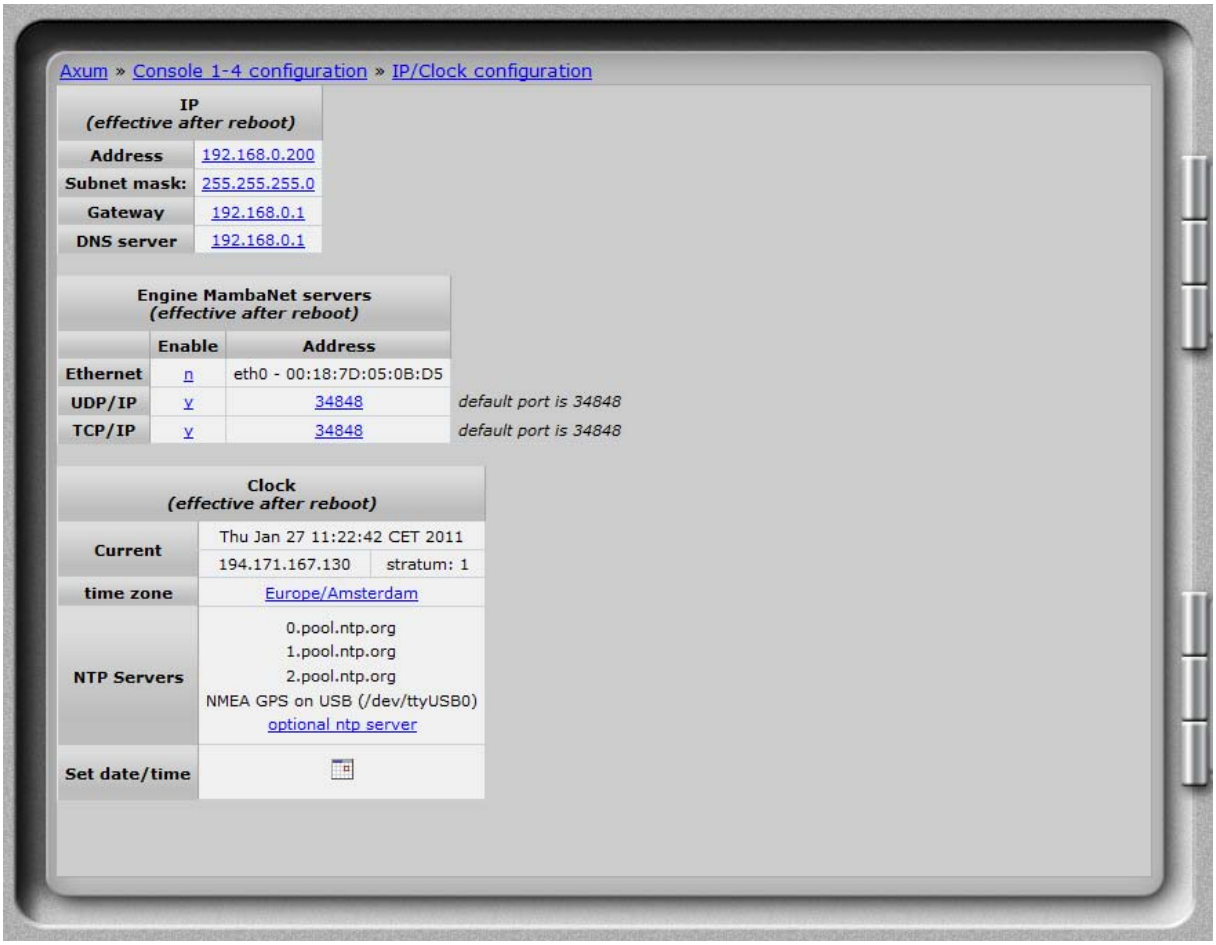


Figure 6: IP/Clock configuration

6.1.1.1 IP

Here you can setup the network settings to be compatible with the required settings in your situation and you can set the time zone to where you are.

It's possible to change the IP, subnet, gateway and DNS server address by clicking on the address. For more information on IP addressing:
http://en.wikipedia.org/wiki/IP_address
WARNING: These setting become active after reboot.

6.1.1.2 Engine MambaNet servers

To enable and/or disable a specific server for Ethernet, UDP and/or TCP you can select here de y/n field. Also the used UDP and TCP port can be changed to a non default value.
WARNING: These setting become active after reboot.

6.1.1.3 Clock

To change the time zone, click on the used time zone (in our example 'Europe/Amsterdam'). You can select the desired time zone in the list box.

The AXUM uses the NTP protocol for accurate clock synchronization. In the section ‘current’ you find the IP address of the used ‘clock master’ and its ‘stratum’. For more information on NTP: http://en.wikipedia.org/wiki/Network_Time_Protocol

When IP and DNS settings are setup correct, the AXUM will automatically synchronize to a pool of time servers. The AXUM is also able to use a GPS receiver via USB for time synchronization. next, the AXUM may function as a NTP server for the surfaces. There for, on the webserver of the control surfaces you can configure the 'optional ntp server' and fill in the IP address of the ntp server (e.g. 192.168.0.200).

Set date/time may be used on system without any synchronization to set the correct time.
In the popup window it is possible to give to correct time and if you click on the ‘day’ it will become direct changed/activated.

Remember that all other changes (NTP and IP settings) will become effective after reboot.

6.1.2 Global configuration

Some overall system settings can be filled in on this webpage.

Figure 7: Global configuration

- **Sample rate**
  You can select a sample rate of 32 kHz, 44.1 kHz en 48kHz. According to this setting, the filters are setup so you have to make sure to select the sample rate you work with. Also when using an external clock.

- **Extern(al) clock**
  If you want to use the external clock (Frame clock in) you can turn it on here.

- **Headroom**
  The internal headroom is fixed at 20 dB, to adjust the headroom on a local input/output you can give an offset level to the sources/destinations or at the rack configuration.

- **Fader top level**
  You can make the fader work with or without 10 dB fader reserve. In the last situation the faders will be 0 dB (unity gain) when the fader is fully up (maximum position).

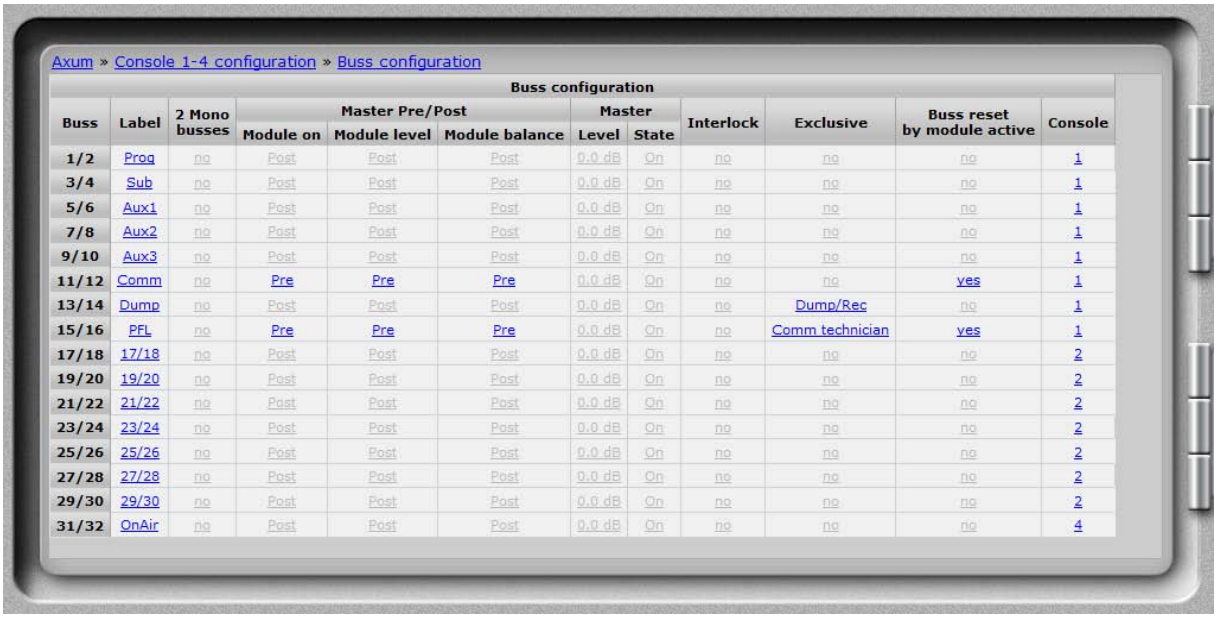
- **Auto momentary**
  Most switch functions can work in a auto-momentary mode. When set to yes a knob will function latching when pressed shortly. But with a long press (>750 mS) the knob reacts like a momentary switch (function active while pressed).

- **Startup state**
  Here you can select to use a known startup state which is the ‘programmed defaults’ or use a ‘backup of the last situation’.
  Programmed defaults are the defaults as setup in the web-configuration. An backup of the console is saved once a minute, which means you will return to (almost) the last situation.

- **Console information**
  Here you can share some details to have an easier identification in a multi-studio environment.

6.1.3 Mix buss configuration

You have to setup the busses to create the names, console assignment and functionality of the Busses. Here we see the setup for a single console buss setup:



Axum » Console 1-4 configuration » Buss configuration

Buss configuration

Buss	Label	2 Mono busses	Master Pre/Post			Master		Interlock	Exclusive	Buss reset by module active	Console
			Module on	Module level	Module balance	Level	State				
1/2	Prog	no	Post	Post	Post	0.0 dB	On	no	no	no	1
3/4	Sub	no	Post	Post	Post	0.0 dB	On	no	no	no	1
5/6	Aux1	no	Post	Post	Post	0.0 dB	On	no	no	no	1
7/8	Aux2	no	Post	Post	Post	0.0 dB	On	no	no	no	1
9/10	Aux3	no	Post	Post	Post	0.0 dB	On	no	no	no	1
11/12	Comm	no	Pre	Pre	Pre	0.0 dB	On	no	no	yes	1
13/14	Dump	no	Post	Post	Post	0.0 dB	On	no	Dump/Rec	no	1
15/16	PFL	no	Pre	Pre	Pre	0.0 dB	On	no	Comm technician	yes	1
17/18	17/18	no	Post	Post	Post	0.0 dB	On	no	no	no	2
19/20	19/20	no	Post	Post	Post	0.0 dB	On	no	no	no	2
21/22	21/22	no	Post	Post	Post	0.0 dB	On	no	no	no	2
23/24	23/24	no	Post	Post	Post	0.0 dB	On	no	no	no	2
25/26	25/26	no	Post	Post	Post	0.0 dB	On	no	no	no	2
27/28	27/28	no	Post	Post	Post	0.0 dB	On	no	no	no	2
29/30	29/30	no	Post	Post	Post	0.0 dB	On	no	no	no	2
31/32	OnAir	no	Post	Post	Post	0.0 dB	On	no	no	no	4

Figure 8: Buss configuration

- **Label**
  The name given to this buss.

- **2 Mono busses**
  It is possible to make 2 mono busses from one stereo buss. All buss-sends, to this buss, on the module's will now include stereo to mono summing.

- **Master pre/post**
  You can choose the buss to be pre or post **ON**, **level** (comparable with pre/post fader) and **balance** (could be your pan-pot).

- **Master level/state**
  This setting is used as programmed startup level, so the buss masters are in a known state.

- **Interlock**
  If you make a buss interlock, only 1 module can be assigned at the same time.

- **Exclusive**
  When routing to an Dump/Rec exclusive buss is made, the routing to all other busses on that module will be disabled. This is useful for a so called 'dump buss'.
  The selections Comm technician and Comm producer are used if you want to make a communication buss. Such buss makes it possible to let presenters talk with hybrid or to talk with an technician/producer.

- **Buss reset**
  This setting can be used to create a CUE/PFL buss with auto-reset (CUE Reset).
  If you have multiple studios and CUE/PFL busses you may assign reset to multiple busses.

- **Console**
  You can select to which console a buss belongs.

6.1.4 Monitor buss configuration

Per DSP card, you have 4 stereo monitor busses that can be used. They need a name, console assignment and configuration so they can work properly:

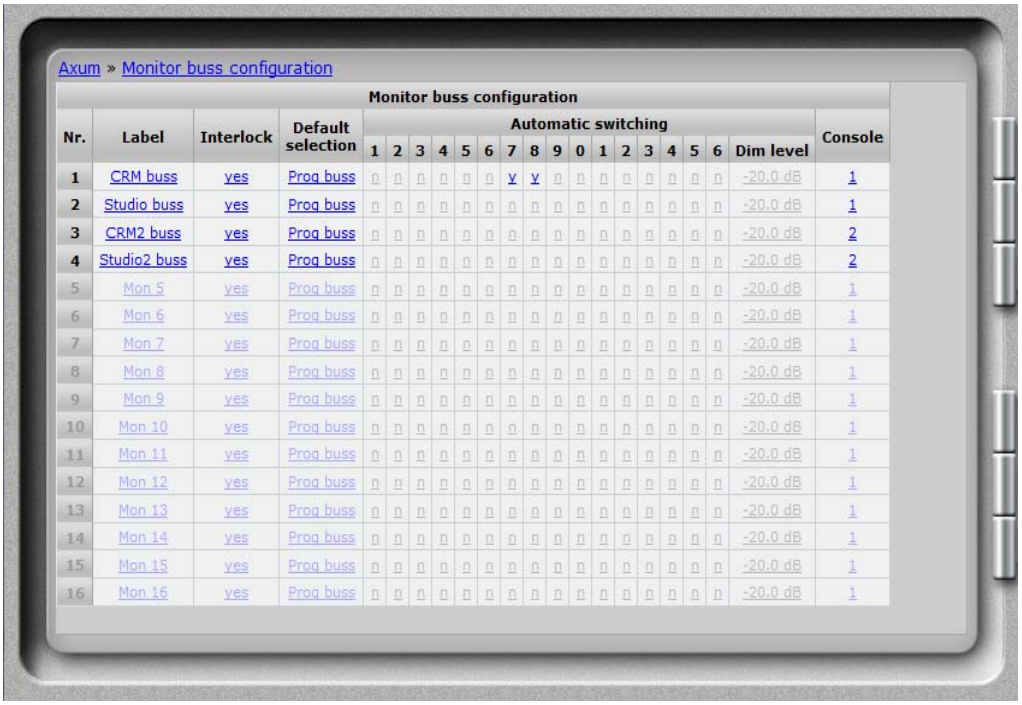


Figure 9: Monitor buss configuration

- **Label**
  Here you give a name to this monitor buss

- **Interlock**
  Yes means only one source is active at the same time, on this monitor buss.

- **Default selection**
  If the last selected source is turned off it will always go to the default selection.
  This selection is also your startup default.

- **Automatic switching**.
  You can tell the Engine that a monitor buss switches automatically when the ‘source buss’ is activated. Also known as ‘PFL to CRM’. If you have two separate studios’ you can have multiple automatically switched busses (e.g. PFL 1 and PFL 2).
  When to mix buss is an exclusive buss, the monitor buss will also switch ‘exclusive’; normally automatic switching will be summing with the set up ‘Dim level’.

- **Dim level**
  When you have set the monitor buss to switch automatically, the source signal is dimmed by the filled in level and the buss that is switched on to the Monitor buss is at unity gain (0 dB).

- **Console**
  You can select to which console a monitor buss belongs.

6.1.5 Source configuration

The 19” rack unit can accept various I/O cards. These inserted I/O cards can accept audio in various formats. This is because the audio connected to the I/O cards can have different channel relations (mono, stereo). To create a user readable label you have to configure sources.
Such a source is the entity you can select to be the input of your module in the mixing console.
See below for a simple source list example:

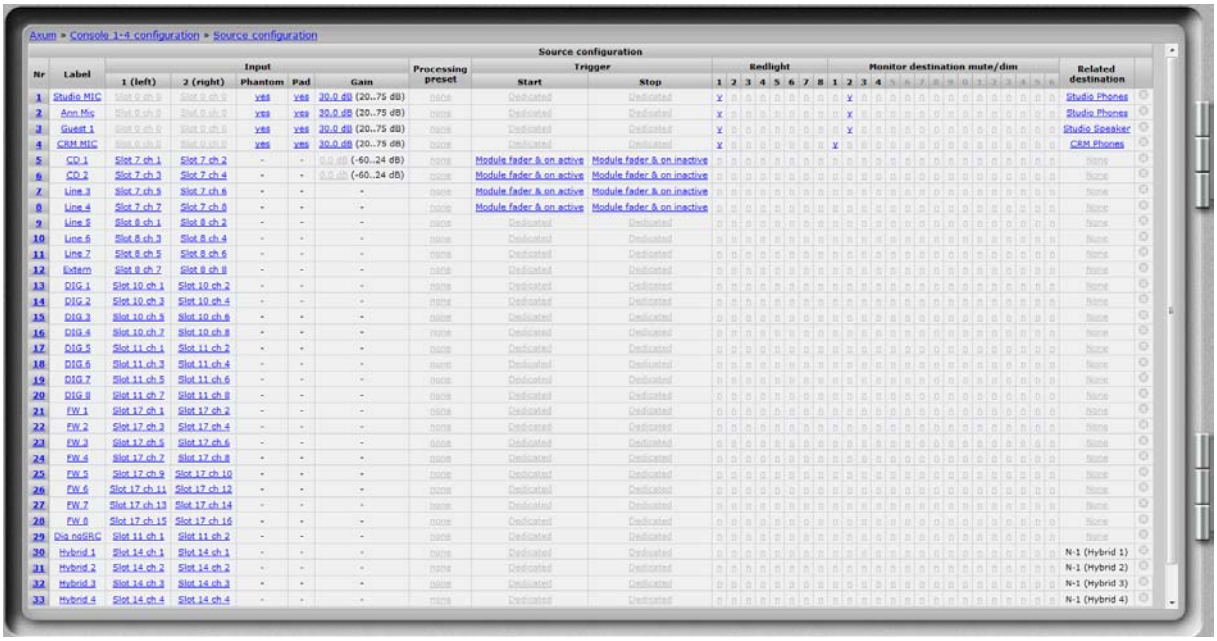


Figure 10: Source configuration

- **Nr**
  Here you can reposition the destination to make the list in a convenient order.

- **Label**
  Name of the source you are creating.

- **Input 1/2**
  Here you select the physical slot and input of the card you want to assign to this source.
  For mono sources you selected the same input for left and right.

- **Phantom**
  The phantom power for this source is turned on/off at startup.
  (this field is only available when the source-phantom function is also assigned to an object; e.g. via rack configuration)

- **Pad**
  The PAD for this source is turned on/off at startup.
  (this field is only available when the source-pad function is also assigned to an object; e.g. via rack configuration)

- **Gain**
  The source gain for this source is at startup set to this level.
  (this field is only available when the source-gain function is also assigned to an object; e.g. via rack configuration)

- **Processing preset**
  If this source is selected on a module, by the 'source select' function (not via module or console preset), this processing preset is 'set' on the module.

- **Trigger start**
  Here you can configure how the source start/stop change is triggered:
  - Dedicated, the module fader and on are not triggering start/stop only the dedicated start/stop controllers.
  - Module fader on, the fader on will trigger the start as well.
  - Module on, the on switch will trigger the start as well.
  - Module fader on & on, the fader must be open and on active then the start is triggered.

  Dedicated start/stop objects will work in parallel with these 'trigger start/stop' modes

- **Trigger stop**
  Here you can configure how the source start/stop change is triggered:
  - Dedicated, the module fader and on are not triggering start/stop only the dedicated start/stop controllers.
  - Module fader off, the fader off will trigger the stop as well.
  - Module off, the on switch will trigger the stop as well.
  - Module fader off & off, the fader must be closed or on inactive then the stop is triggered.

  Dedicated start/stop objects will work in parallel with these 'trigger start/stop' modes

- **Red-light.**
  When this source becomes active on a module, the corresponding Red-light buss becomes active.

- **Monitor destination mute**
  When this source becomes active on a module, the corresponding monitor buss will be muted.

- **Related destination**
  When you give a source a related destination it is possible to use TB functions on the module and communication features from the GPIOs. For example you will make the relation announcer microphone to announcer headphone.

- **Delete**
  When you click on this column the source will be deleted (and also all references are deleted).

- **Create a new source**
  By clicking on this link a popup will appear where you have to setup the physical inputs and label for the new source.

6.1.6 Extern source configuration

Each DSP card can handle four stereo monitor busses (with 4 DSP cards a max of 16 stereo monitor busses is possible). For each DSP card you can configure 8 external stereo sources, beyond the 16 stereo mixing busses which are fixed available in the monitor section.

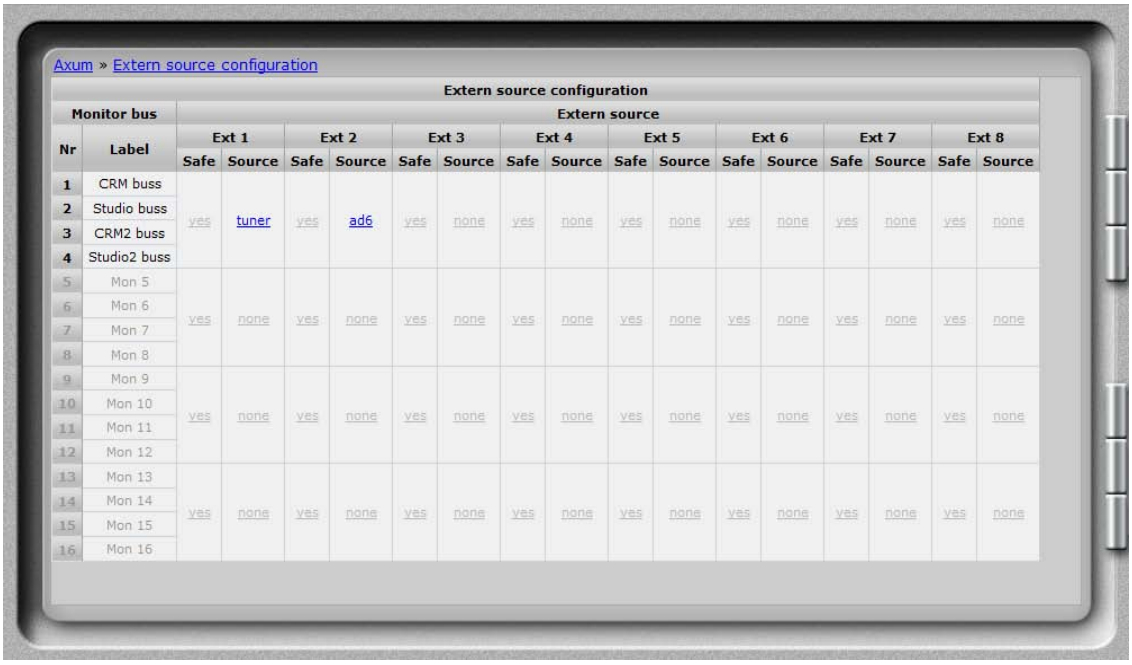


Figure 11: External source configuration

- **Safe**
  Extern source can be configured to be 'interlock safe'.
  Normally only one buss or external input can be active on the monitor buss if configured to be 'interlock'. But sometimes it is important your signal will not disappear if another CRM-source is selected, in that case you can set the external source to be 'safe'.

- **Source**
  Here you can select which signal routes to this 'external input'.
  You can choose:
  - Input sources (Mic, line, dig etc. etc.)
  - Mix busses
  - Monitor busses
  - Insert outs (of modules)
  - N-1 signals (for a single module)

6.1.7 Destination configuration

The 19” rack unit can accept various I/O cards. With these cards, you can send audio from the Axum digital audio system to the audio format you require. Because the audio connected to the I/O cards can have different channel relations (mono, stereo) a combination has to be made. A user readable label has to be created to configure destinations. Such destination is the entity you can select to be the output of a mixing buss of the mixing console. See an example destination list:

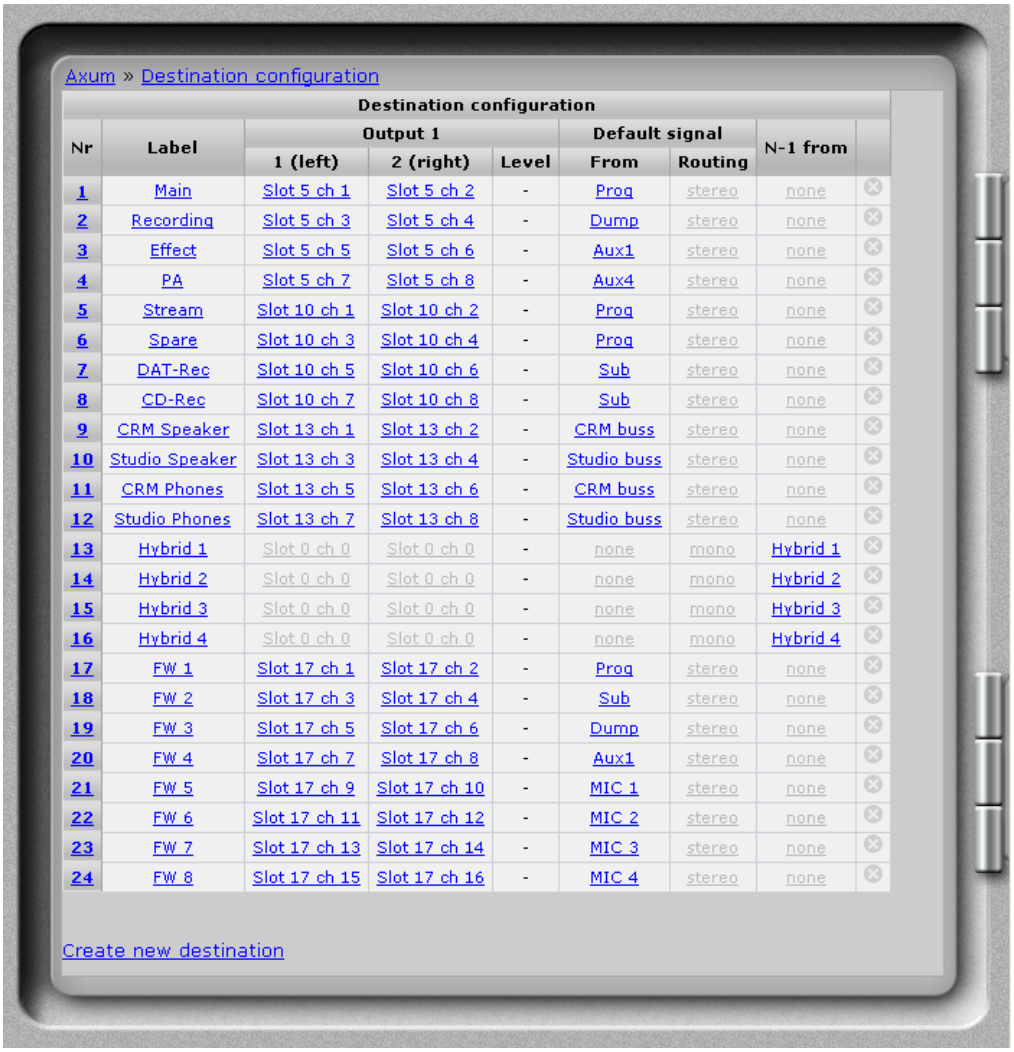


Figure 12: Destination configuration

- **Nr**
  Here you can reposition the destination to make the list in a convenient order.

- **Label**
  Name of the destination you are setting up.

- **Output 1/2**
  Here you select the physical slot and output of the card you want to assign to this destination. For a mono output you have to select only one of the left or right outputs to a physical slot/ch.

- **Level**
  The destination level for this source is at startup set to this level; for example to adjust headroom for a single output.

(this field is only available when the destination-level function is also assigned to an object; e.g. via rack configuration)

- **Default signal from**
  This destination/output will send audio from the default selected source (except if a N-1 is active, then automatically the N-1 signal is selected).
  You can choose:
  - Input sources (Mic, line, dig etc. etc.)
  - Mix busses
  - Monitor busses
  - Insert outs (of modules)

- **Default signal routing**
  Here you can choose which signal feeds the physical outputs:
  Stereo (if no mix minus source is assigned):
  Output left and right received their corresponding signal
  Left:
  Output left and right both receive the left signal.
  Right:
  Output left and right both receive the right signal.
  Mono (only if a mix minus source is assigned):
  The mix minus signal is always a mono signal.

- **N-1 from/mix minus source**
  When the selected source is assigned to a module, this destination automatically creates an N-1 using the selected source. There is no limitation on the amount of N-1s, every module is able to make its own N-1.

- **Delete**
  When you click on this column the destination will be deleted (and also all references are deleted).

- **Create a new destination**
  By clicking on this link a popup will appear where you have to setup the physical outputs and label for the new destination. When you select the same output for both channels, the system will use it on the left output and set the right to none.

6.1.8 Talkback configuration

This page makes it possible to select the sources for the 16 talkback busses available in the AXUM. A talkback buss may be summed/switched to any destination of the AXUM system, this will not require any DSP resources.

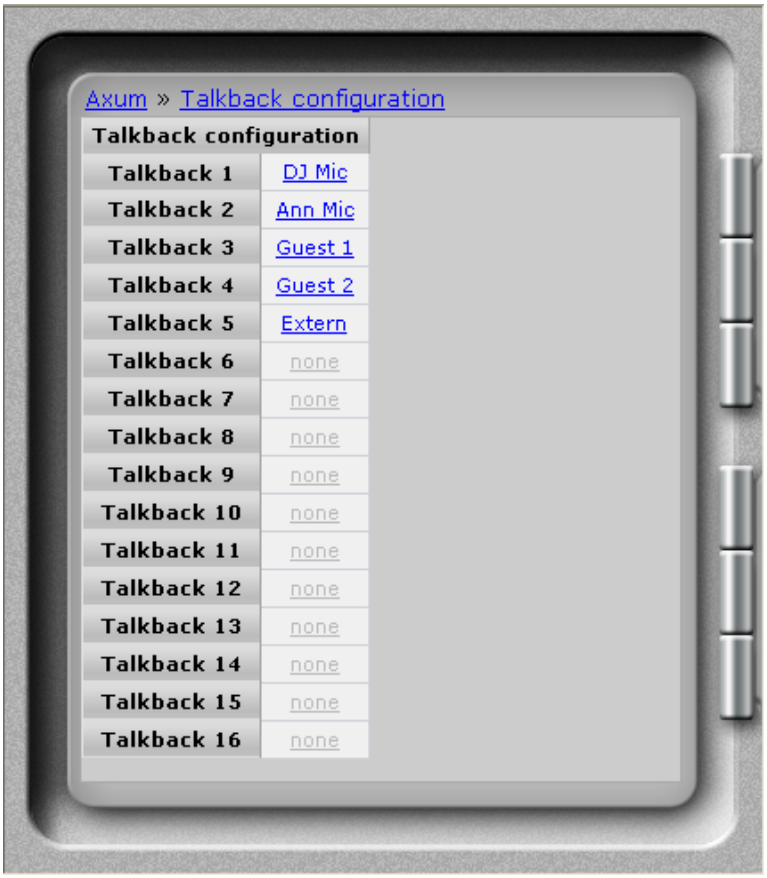


Figure 13: Talkback configuration

- **Source**
  Here you can select which signal routes to a talkback buss.
  You can choose:
  - Input sources (Mic, line, dig etc. etc.)
  - Mix busses
  - Monitor busses
  - Insert outs (of modules)
  - N-1 signals (for a single module)

6.1.9 Processing presets

It is possible to set the module processing when a source is selected (via 'source select' or a module preset) , the information for this functionality is stored in the processing presets.

Figure 14: Processing presets

- **Nr**
  Here you can reposition the preset to make the list in a convenient order.

- **Label**
  Name of the preset.

- **Settings.**
  Shows a new page where you can configure the preset.

- **Delete**
  When you click on this column the preset will be deleted (and also all references are deleted).

- **Copy to new preset**
  This function can be used to get the current settings copied in a new preset.
  A popup will appear where you have to setup the label for the new preset.

- **Create new preset**
  By clicking on this link a popup will appear where you have to setup the label for the new preset.

6.1.9.1 Settings

All processing parameters can be configured in the processing preset settings webpage

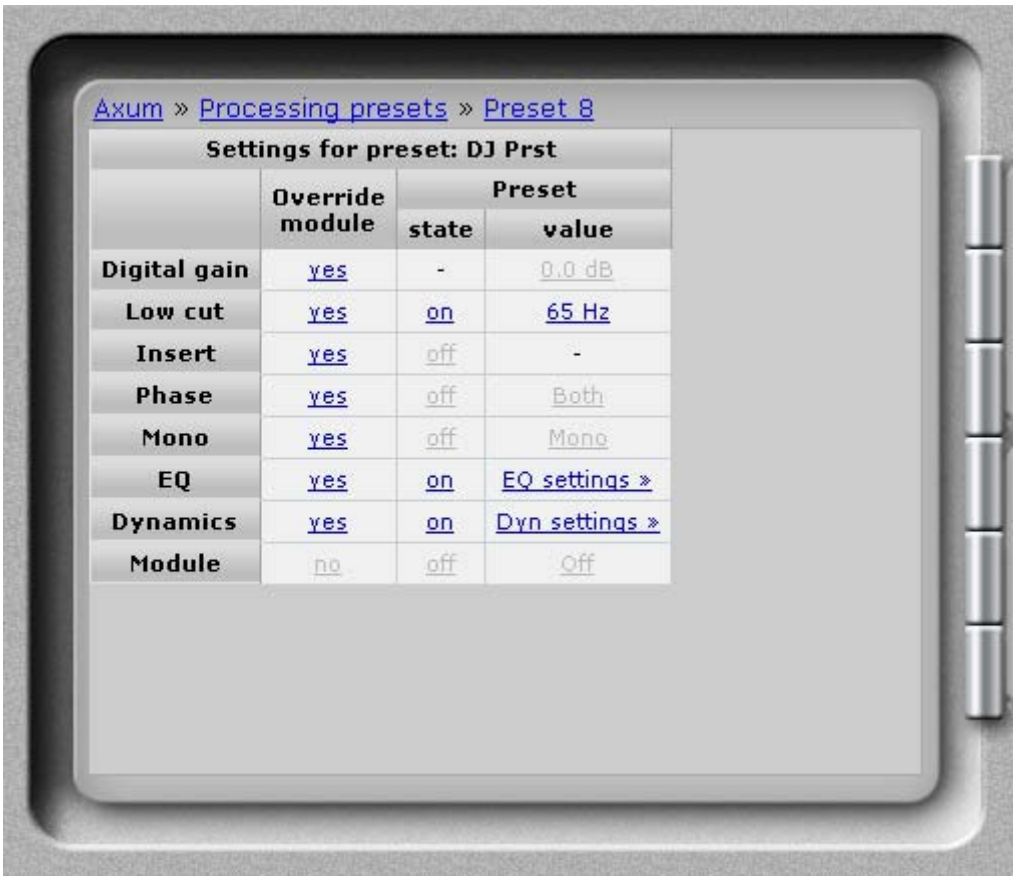


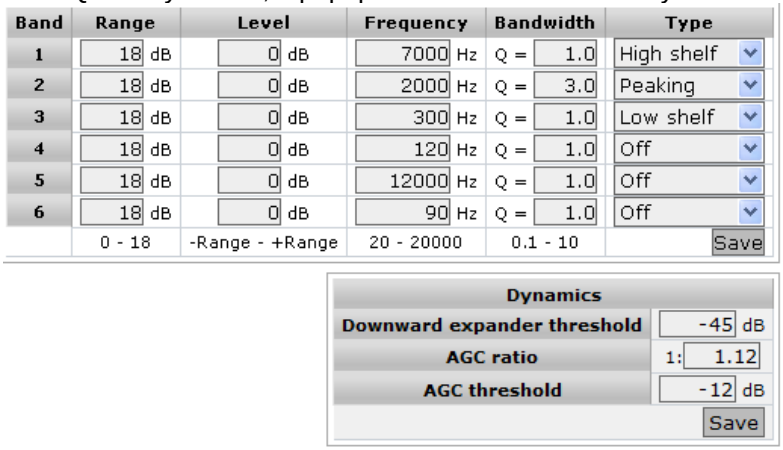
Figure 15: Processing preset settings

- **Override module**
  If set to no, the module setting will not be affected by this preset.
  If set to yes, this preset will change the settings of the module for the corresponding processing section (Digital gain, Low cut etc. etc.)

- **State**
  if the override is turned to yes, you can set the processing section to ‘on’ or ‘off’.
  for example:
  - Microphones will often have the state EQ on
  - CD players will often have the state EQ off

- **Value**
  if the override is turned to yes, this value is set for the corresponding processing section.

For EQ and dynamics, a popup window is shown. Here you can set multiple values.



Band	Range	Level	Frequency	Bandwidth	Type
1	18 dB	0 dB	7000 Hz	Q = 1.0	High shelf
2	18 dB	0 dB	2000 Hz	Q = 3.0	Peaking
3	18 dB	0 dB	300 Hz	Q = 1.0	Low shelf
4	18 dB	0 dB	120 Hz	Q = 1.0	Off
5	18 dB	0 dB	12000 Hz	Q = 1.0	Off
6	18 dB	0 dB	90 Hz	Q = 1.0	Off
	0 - 18	-Range - +Range	20 - 20000	0.1 - 10	Save

Dynamics	
Downward expander threshold	-45 dB
AGC ratio	1: 1.12
AGC threshold	-12 dB
	Save

Figure 16: Processing preset EQ/Dynamics settings

EQ Range
Maximal adjustment you may generate with this band.

EQ Level
Level of the band that this preset will set.
The value must be within the EQ Range

EQ Frequency
Frequency of the band that this preset will set.
The frequency range is 20-20000 Hz.

EQ Bandwidth
Bandwidth of the band that this preset will set.
The bandwidth range is 0.1 – 10

EQ type
Type of the band that this preset will set.
You can choose:
- Off
- High pass filter (6 dB/Oct)
- Low shelf
- Peaking (is the normal EQ curve)
- High shelf
- Low pass filter
- Band pass filter
- notch filter

Downward expander threshold
Threshold of the downward expander (to reduce ambient sound) that this preset will set.
The threshold range is -50 dB till 0 dB.

AGC ratio
The ratio for this automatic gain control is given in 1:1 to 1:25

AGC threshold
Threshold of the AGC, above the threshold the AGC tries to hold the signal 0 dB.
the threshold range is -30 till 0 dB.
(Be aware with a low threshold, you may generate a lot of gain)

6.1.10 Module assignment

Modules can be assigned to one of the 4 consoles, after this and a correct assignment of the busses (in buss configuration) to the consoles you may click ‘generate’ to make a correct assignment configuration.
Afterwards you can override the generate assignments by clicking the ‘y’/’n’ fields. For example you can create a buss that is available to all consoles.

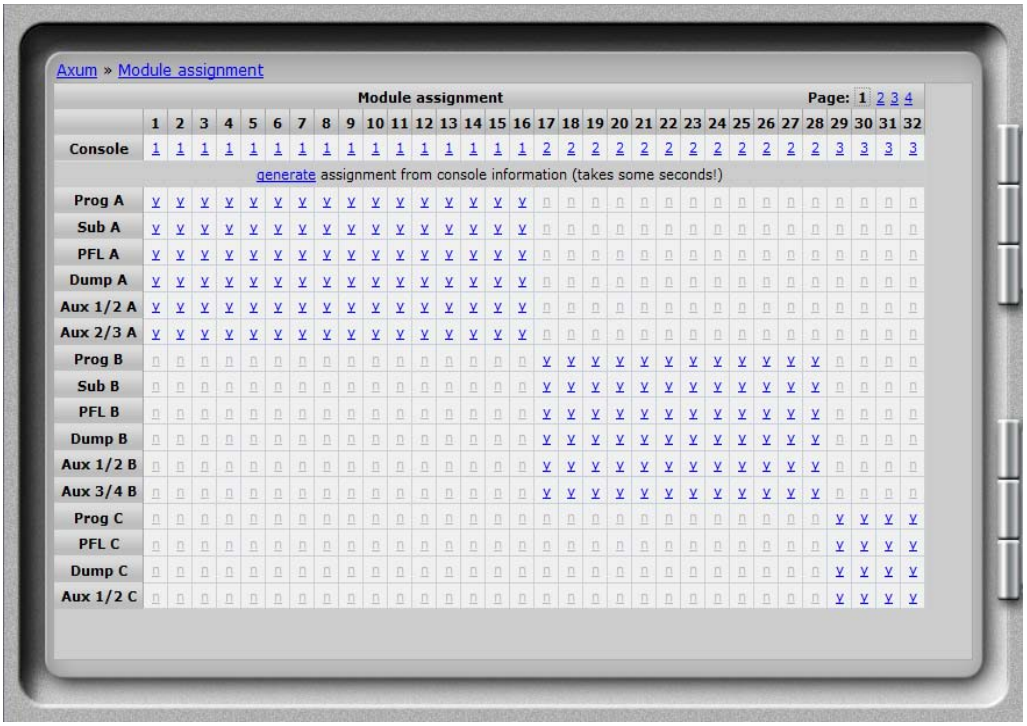
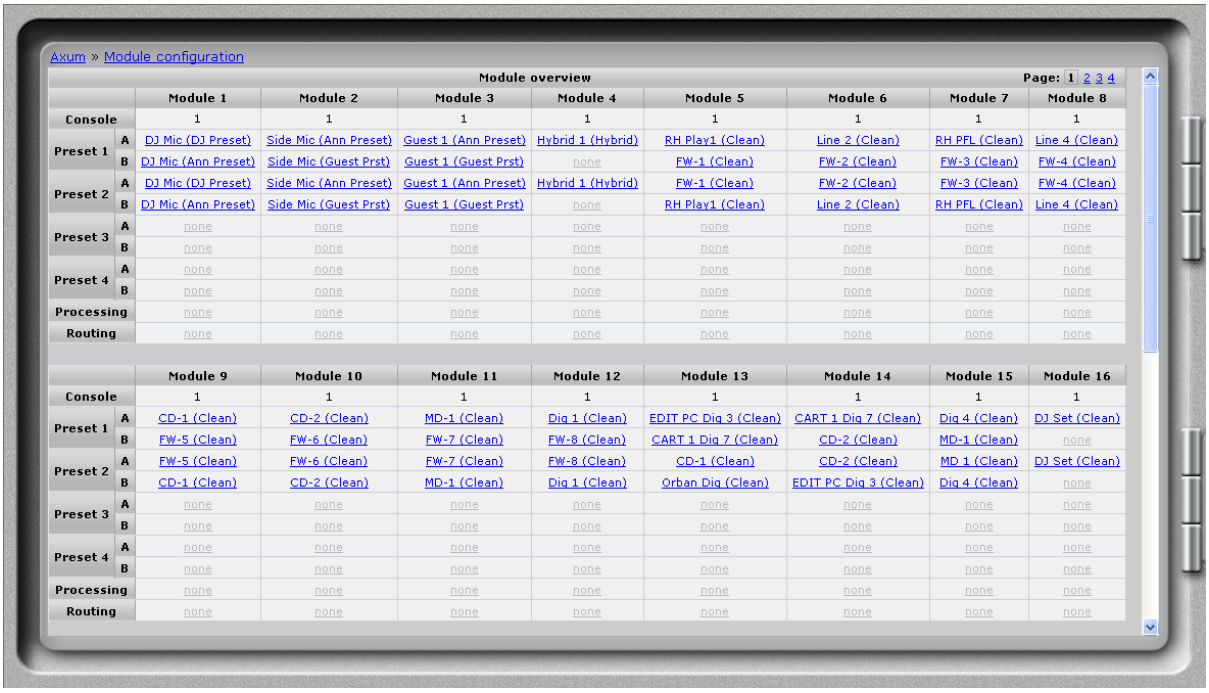


Figure 17: Module assignment

6.1.11 Module configuration

The module configuration makes it possible to give modules a default setting (after powering on) and you can also configure module presets 1A/1B, 2A/2B, 3A/3B, 4A/4B.



Axum » Module configuration

Module overview — Page: 1 2 3 4

		Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Module 8
Console		1	1	1	1	1	1	1	1
Preset 1	A	DJ Mic (DJ Preset)	Side Mic (Ann Preset)	Guest 1 (Ann Preset)	Hybrid 1 (Hybrid)	RH Play1 (Clean)	Line 2 (Clean)	RH PFL (Clean)	Line 4 (Clean)
	B	DJ Mic (Ann Preset)	Side Mic (Guest Prst)	Guest 1 (Guest Prst)	none	FW-1 (Clean)	FW-2 (Clean)	FW-3 (Clean)	FW-4 (Clean)
Preset 2	A	DJ Mic (DJ Preset)	Side Mic (Ann Preset)	Guest 1 (Ann Preset)	Hybrid 1 (Hybrid)	FW-1 (Clean)	FW-2 (Clean)	FW-3 (Clean)	FW-4 (Clean)
	B	DJ Mic (Ann Preset)	Side Mic (Guest Prst)	Guest 1 (Guest Prst)	none	RH Play1 (Clean)	Line 2 (Clean)	RH PFL (Clean)	Line 4 (Clean)
Preset 3	A	none	none	none	none	none	none	none	none
	B	none	none	none	none	none	none	none	none
Preset 4	A	none	none	none	none	none	none	none	none
	B	none	none	none	none	none	none	none	none
Processing		none	none	none	none	none	none	none	none
Routing		none	none	none	none	none	none	none	none

		Module 9	Module 10	Module 11	Module 12	Module 13	Module 14	Module 15	Module 16
Console		1	1	1	1	1	1	1	1
Preset 1	A	CD-1 (Clean)	CD-2 (Clean)	MD-1 (Clean)	Dig 1 (Clean)	EDIT PC Dig 3 (Clean)	CART 1 Dig 7 (Clean)	Dig 4 (Clean)	DJ Set (Clean)
	B	FW-5 (Clean)	FW-6 (Clean)	FW-7 (Clean)	FW-8 (Clean)	CART 1 Dig 7 (Clean)	CD-2 (Clean)	MD-1 (Clean)	none
Preset 2	A	FW-5 (Clean)	FW-6 (Clean)	FW-7 (Clean)	FW-8 (Clean)	CD-1 (Clean)	CD-2 (Clean)	MD 1 (Clean)	DJ Set (Clean)
	B	CD-1 (Clean)	CD-2 (Clean)	MD-1 (Clean)	Dig 1 (Clean)	Orban Dig (Clean)	EDIT PC Dig 3 (Clean)	Dig 4 (Clean)	none
Preset 3	A	none	none	none	none	none	none	none	none
	B	none	none	none	none	none	none	none	none
Preset 4	A	none	none	none	none	none	none	none	none
	B	none	none	none	none	none	none	none	none
Processing		none	none	none	none	none	none	none	none
Routing		none	none	none	none	none	none	none	none

Figure 18: Input module configuration

- **Console**
  Shows to which console the module is assigned.

- **Preset 1A/1B, 2A/2B, 3A/3B, 4A/4B**
  Shows the source and processing preset selected for corresponding module preset. If the '#' symbol appears there is an active routing preset.
  (click on the link to go to the configuration page for the module)

- **Processing**
  Here you can see if there is any processing done.
  (click on the link to go to the configuration page for the module)

- **Routing**
  (click on the link to go to the configuration page for the module)

6.1.11.1 Module configuration page

On this page you can setup the default module configuration, used at startup if programmed default is selected in global configuration. If you have made your settings and you would like to copy them to all modules in this console (for example if you want to use the same EQ center frequencies) you can simply hit 'To all console x modules' after you made and checked the settings on the current module.

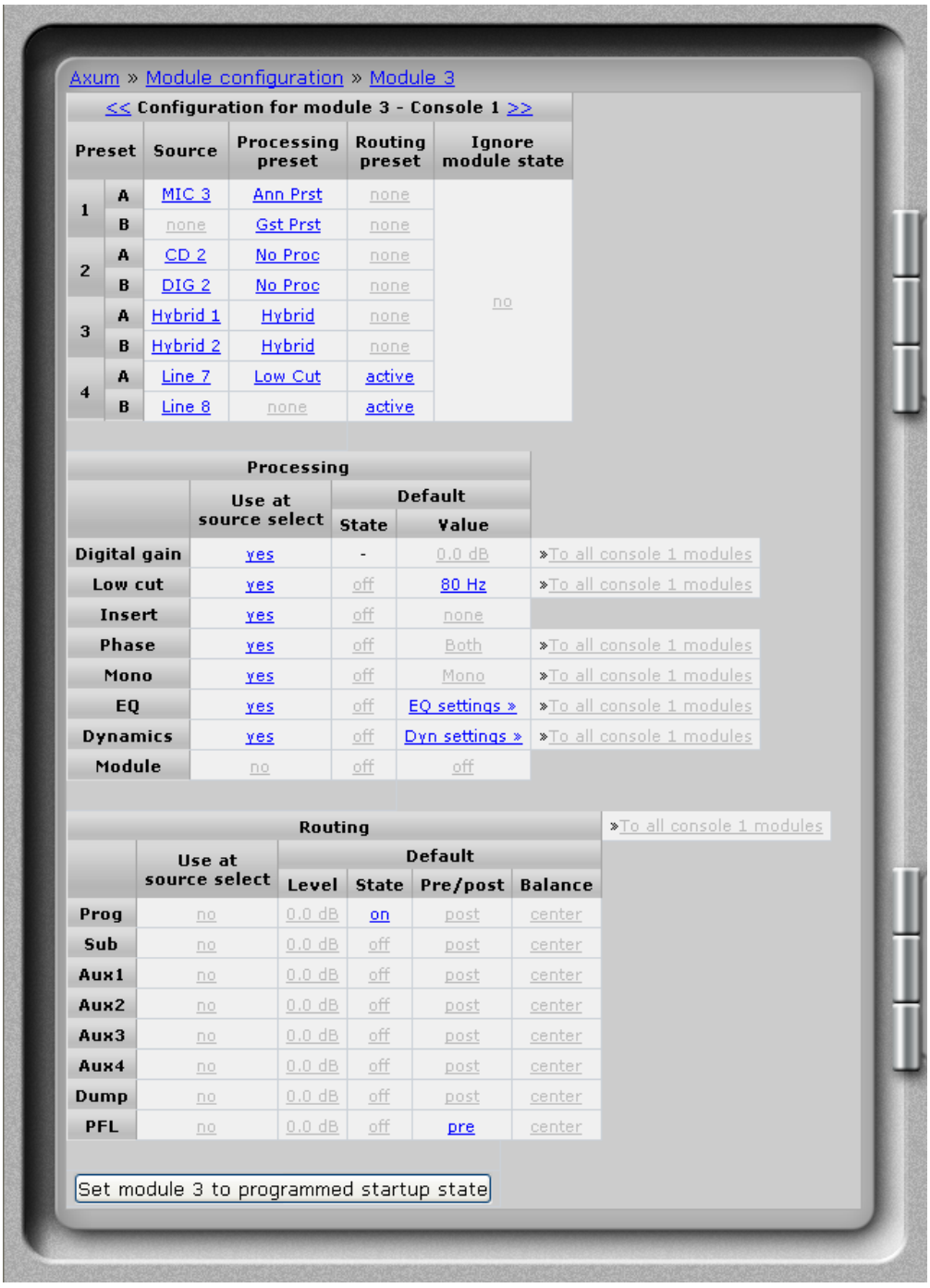


Figure 19: Module configuration page

6.1.11.2 Module preset 1A/1B, 2A/2B, 3A/3B, 4A/4B

Here you select the source, processing preset and routing preset that is used when module preset 1A/1B, 2A/2B, 3A/3B, 4A/4B is selected. After a click on 'routing' a popup appears with the routing possibilities (this depends on the console assignment).

- Source
  If you click here a popup appears with a list of all available sources. Select the source you want to use in this module preset.

- Processing
  If you click here a popup appears with a list of all available processing presets. Select the source you want to use in this module preset.

- **Routing Preset**

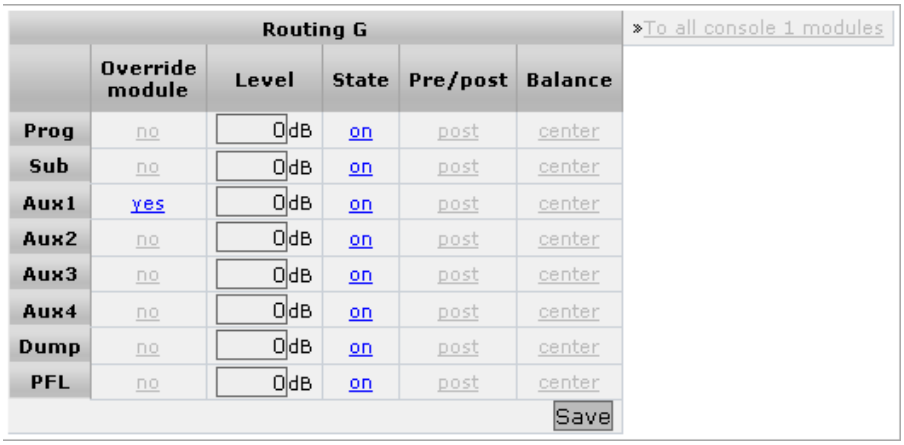


Figure 20: Module routing preset

Override module
If set to no, the module setting will not be affected by this preset. If set to yes, this preset will change the settings of the module for the corresponding buss.

Level
If the override is turned to yes, this will set the send level to the buss for this module when current preset is selected.

State
If the override is turned to yes, this will set the buss state to 'on' or 'off' for this module when this module preset is select.

Pre/Post
If the override is turned to yes, this will set the buss pre or post for this module when this module preset is select.

Balance
If the override is turned to yes, this will set the buss balance for this module when this module preset is select.

To all console 1-4 module
With this link you can copy the current settings to the same routing preset (1A/1B, 2A/2B, 3A/3B, 4A/4B) at all modules of the console where this module is assigned to.

- **Ignore module state**
  When presets are recalled, it checks the module state to prevent recalling 'onair' signals. The preset will wait till the module is switched off air.
  If the ignore module state function is switched to yes, the presets will not check the module state and forces the recall to be done always!

6.1.11.3 Processing

These are the programmed processing defaults for the modules. Depending on the startup settings these processing defaults will be used at startup (programmed defaults in global configuration).

The field 'Use at source select' determines if the default module processing in the source configuration is used when a source is assigned via the module source select functionality and no processing preset is assigned in the 'source configuration'.

The following state/value processing sections are available:

- **Digital Gain level**
  You can enter a default gain level for each module and determine if the default state must be on or off.

- **Low cut frequency**
  You can enter a default frequency of the low cut filter and determine if the default state must be on or off.

- **Insert**
  You may select a source to be your insert return for this module and determine if the default state must be on or off.

- **Phase**
  Set the phase default settings (Left only, right only or both channels are phase reversed). It is also possible to determine if the default state must be on or off.

- **Mono**
  Give the mono settings default values (left, right or mono-sum of left and right). It is also possible to determine if the default state must be on or off.

- **EQ**
  By clicking on EQ you can set the default equalizer settings it will appear in a popup window. The state may be used to set the EQ default on or off.

- **Dynamics**
  This setting is used as default, the popup shows the parameters to setup. The state may be used to set the dynamics to be default on or off.

- **Module**
  Here you may set the default module level at startup, the state will be the default module on/off state.

The 'Ignore module state' function makes it possible to load a processing preset even if the module is active (fader open and module on). This may be necessary if you use presets on a 'virtual console'.

6.1.11.4 Routing

The field ‘Use at source select’ determines if the default module routing is used when a source is assigned via the module source select functionality .

The following routing sections are available:

- **Buss level**
  You may predefine the send level of a module to the busses (e.g. Aux send).

- **Buss status**
  You have to setup the startup status for the busses. With this setting you set the buss routing (e.g. Program on/off or CUE on/off).

- **Buss Pre/Post**
  It’s possible to have pre/post selection per module, the startup setting can be configured here.

- **Balance**
  You can select the balance of the buss sent.

6.1.11.5 Set module 1 to programmed startup state

When you click this button the module will directly load the setup module defaults.

6.1.12 Mix/monitor buss presets

It is possible to make mix/monitor buss presets to make sure the correct buss master states and levels are set for different programs. Also you can make sure the required monitor buss selection is made.

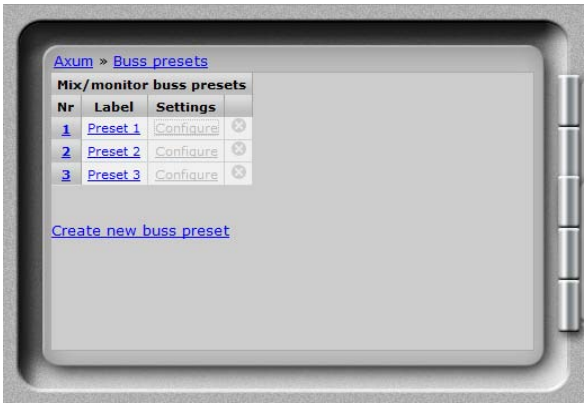


Figure 21: Mix/monitor buss presets

- **Nr**
  Here you can reposition the preset to make the list in a convenient order.

- **Label**
  Name of the preset.

- **Settings.**
  Shows a new page where you can configure the preset.

- **Delete**
  When you click on this column the preset will be deleted (and also all references are deleted).

- **Create new buss preset**
  By clicking on this link a popup will appear where you have to setup the label for the new preset.

6.1.12.1 Settings

On this page you can set the required levels and state for all busses and monitor busses which are used in the mix/monitor buss preset.

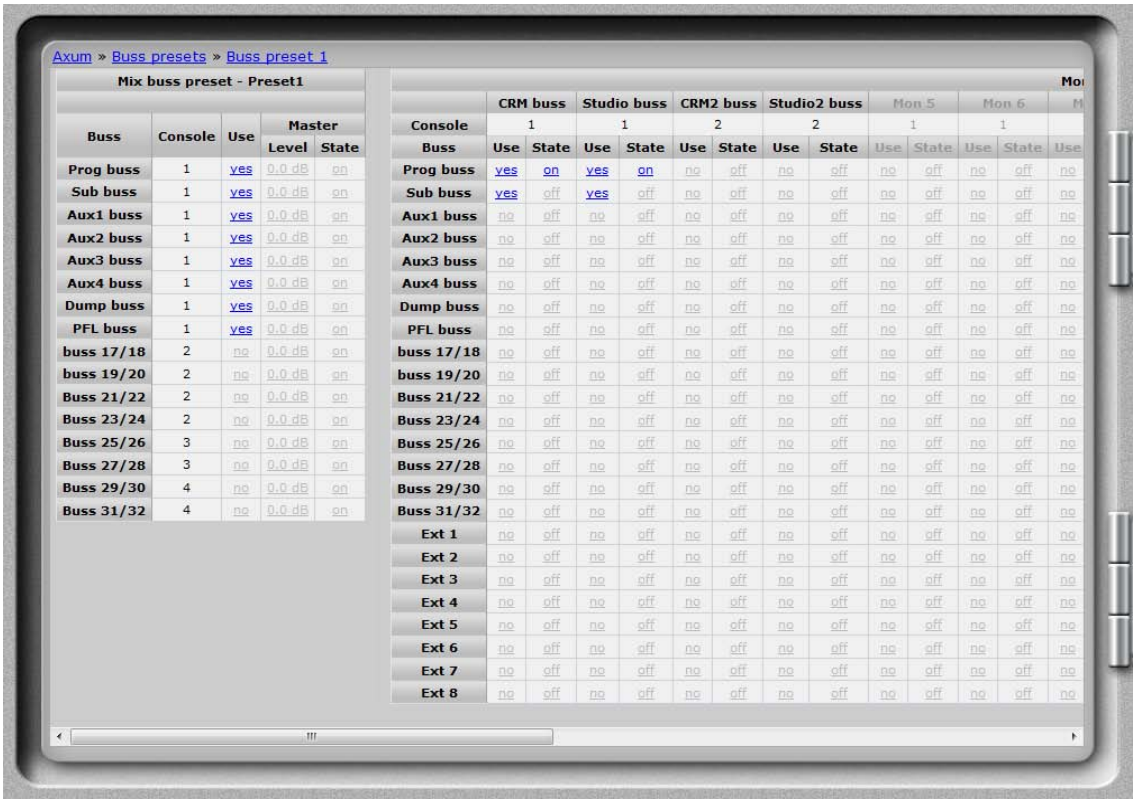


Figure 22: Mix/monitor buss preset settings

6.1.12.2 Mix buss settings

- **Console**
  Displays the console where this mix buss is assigned to.

- **Use**
  When set to 'yes' the settings for this mix buss overrides the current mix settings if the preset is loaded.

- **Master level**
  Here you can give the preset master level of the corresponding mix buss.

- **Master state**
  Here you can give the preset master state of the corresponding mix buss.

6.1.12.3 Monitor buss settings

- **Console**
  Displays the console where this monitor buss is assigned to.

- **Use**
  When set to 'yes' the settings for this monitor buss overrides the current monitor settings if the preset is loaded.

- **State**
  This must be set to ‘on’ to force this monitor-buss routing to be active. When it is set to ‘off’ the monitor-buss routing will be forced to go ‘off’.

6.1.13 Console presets

To recall a complete console you use the console presets, what exactly is recalled is depending on the underlying configuration of:

- Source configuration
- Processing presets
- Module configuration
- Mix/monitor buss presets

When a console preset is recalled it will set all modules to the module preset 'A'-'H' as configured. Secondly it will load the Mix/monitor preset as given in the console preset.

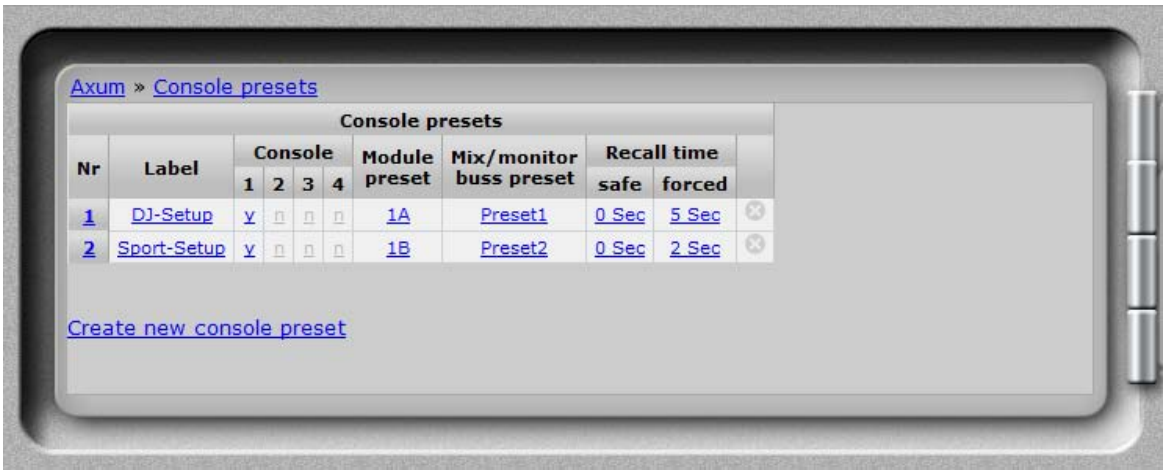


Figure 23: Console presets

- **Nr**
  Here you can reposition the preset to make the list in a convenient order.

- **Label**
  Name of the preset.

- **Console**
  Select to which console or consoles this preset is active.

- **Module preset**
  Here you can select to use module preset 1A/1B, 2A/2B, 3A/3B, 4A/4B.

- **Mix/monitor buss preset**
  Here you can select one of the mix/monitor buss presets to use in this console preset.

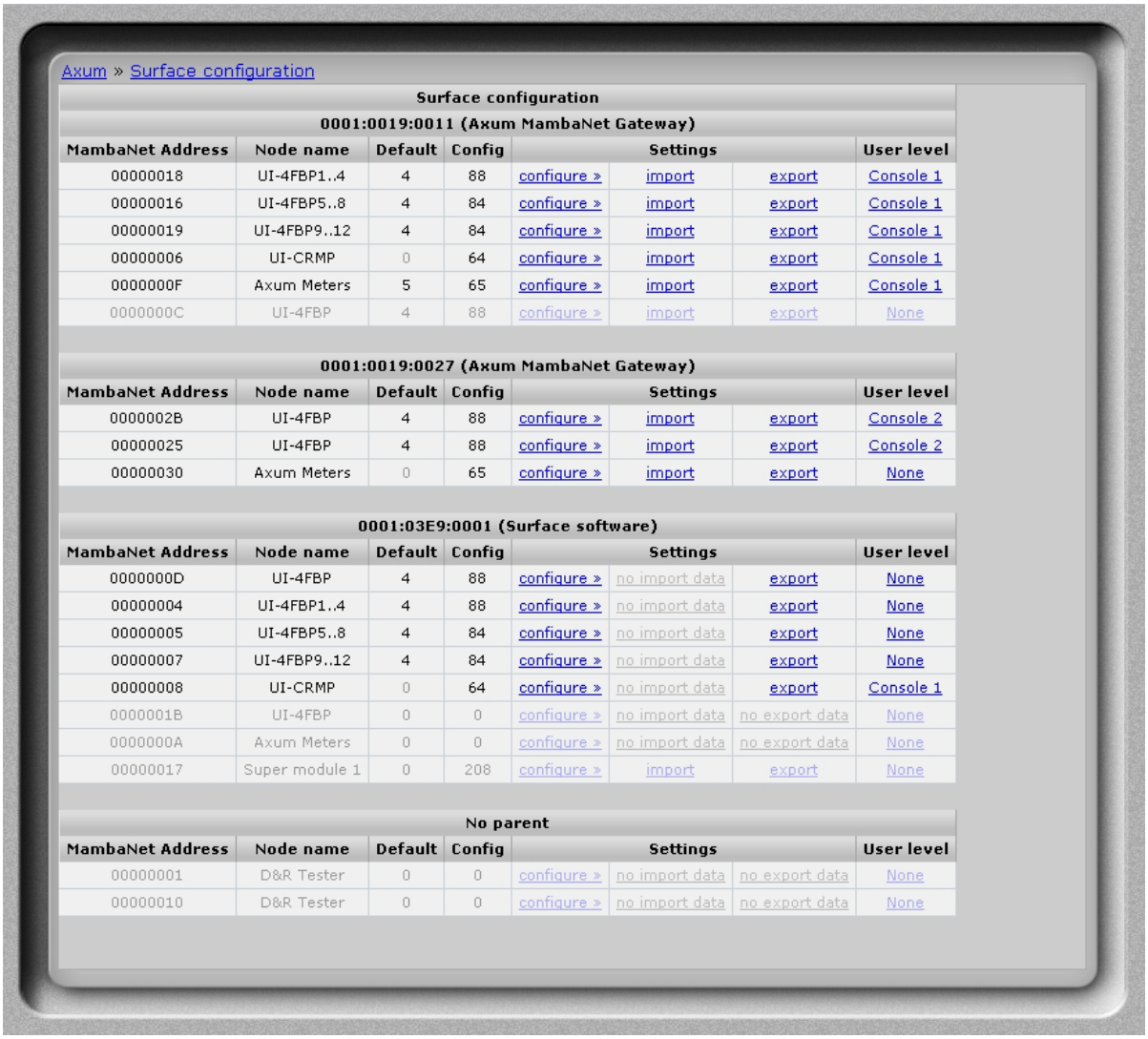
- **Recall time**
  A console preset can be recalled onair safe, so active channels are not recalled. Default you have to press the preset button for 1 second before an 'safe' recall is done. After pressing 3 seconds the active channels are recalled as well (forced).
  You can setup the delay time for the safe and forced console presets, when you give 0 seconds the recall will be done 'direct' when the button is pressed.

- **Delete**
  When you click on this column the preset will be deleted (and also all references are deleted).

- **Create new console preset**
  By clicking on this link a popup will appear where you have to setup the label for the new preset.

6.1.14 Surface configuration

You can see an overview of the boards in the surface(s) on this page. These are grouped together, like their physical layout.



Axum » Surface configuration

Surface configuration

0001:0019:0011 (Axum MambaNet Gateway)

MambaNet Address	Node name	Default	Config	Settings			User level
00000018	UI-4FBP1..4	4	88	configure »	import	export	Console 1
00000016	UI-4FBP5..8	4	84	configure »	import	export	Console 1
00000019	UI-4FBP9..12	4	84	configure »	import	export	Console 1
00000006	UI-CRMP	0	64	configure »	import	export	Console 1
0000000F	Axum Meters	5	65	configure »	import	export	Console 1
0000000C	UI-4FBP	4	88	configure »	import	export	None

0001:0019:0027 (Axum MambaNet Gateway)

MambaNet Address	Node name	Default	Config	Settings			User level
0000002B	UI-4FBP	4	88	configure »	import	export	Console 2
00000025	UI-4FBP	4	88	configure »	import	export	Console 2
00000030	Axum Meters	0	65	configure »	import	export	None

0001:03E9:0001 (Surface software)

MambaNet Address	Node name	Default	Config	Settings			User level
0000000D	UI-4FBP	4	88	configure »	no import data	export	None
00000004	UI-4FBP1..4	4	88	configure »	no import data	export	None
00000005	UI-4FBP5..8	4	84	configure »	no import data	export	None
00000007	UI-4FBP9..12	4	84	configure »	no import data	export	None
00000008	UI-CRMP	0	64	configure »	no import data	export	Console 1
0000001B	UI-4FBP	0	0	configure »	no import data	no export data	None
0000000A	Axum Meters	0	0	configure »	no import data	no export data	None
00000017	Super module 1	0	208	configure »	import	export	None

No parent

MambaNet Address	Node name	Default	Config	Settings			User level
00000001	D&R Tester	0	0	configure »	no import data	no export data	None
00000010	D&R Tester	0	0	configure »	no import data	no export data	None

Figure 24: Surface configuration

- **MambaNet Address**
  Show information on the internal used MambaNet addresses

- **Node name**
  Logical name of the node

- **Default**
  Number of objects that have a default value set.

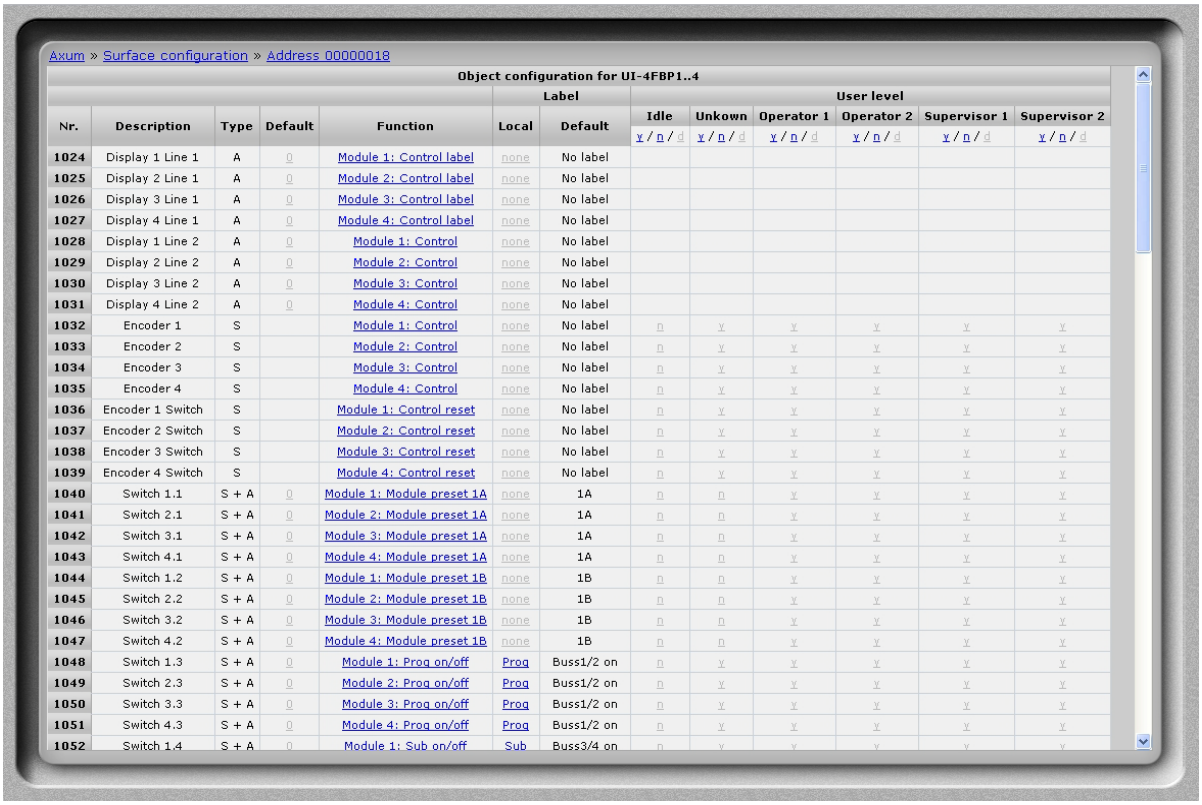
- **Config**
  Number of objects that are configured to an engine function.

- **Import/Export**
  Once you have configured the defaults and used engine functions you can export and import these settings. With export the current configuration is stored in the database, where you have to give a logical name (e.g. Module 5-8). With import you can restore a configuration to the

same or a different node (of the same type). When you import Module 5-8 with an offset of -4 the configuration will be as you expect Module 1-4.

- **User level**
  Here you can define to which console the module belongs in terms of user level. The user level depends on the user logged on to the AXUM system. If 'None' is selected this node will always have full access.

- **Configure**
  When you follow the link configure, you are able to setup the functionality for the different objects on the node. The sensor and actuator data types determine which function is able to connect to the object. For a complete list of the functions, you can go to chapter 20 Appendix C – Engine functions.



Axum » Surface configuration » Address 00000018

Object configuration for UI-4FBP1..4

Nr.	Description	Type	Default	Function	Label		User level					
					Local	Default	Idle	Unkown	Operator 1	Operator 2	Supervisor 1	Supervisor 2
							y / n / d	y / n / d	y / n / d	y / n / d	y / n / d	y / n / d
1024	Display 1 Line 1	A	0	Module 1: Control label	none	No label						
1025	Display 2 Line 1	A	0	Module 2: Control label	none	No label						
1026	Display 3 Line 1	A	0	Module 3: Control label	none	No label						
1027	Display 4 Line 1	A	0	Module 4: Control label	none	No label						
1028	Display 1 Line 2	A	0	Module 1: Control	none	No label						
1029	Display 2 Line 2	A	0	Module 2: Control	none	No label						
1030	Display 3 Line 2	A	0	Module 3: Control	none	No label						
1031	Display 4 Line 2	A	0	Module 4: Control	none	No label						
1032	Encoder 1	S		Module 1: Control	none	No label	n	y	y	y	y	y
1033	Encoder 2	S		Module 2: Control	none	No label	n	y	y	y	y	y
1034	Encoder 3	S		Module 3: Control	none	No label	n	y	y	y	y	y
1035	Encoder 4	S		Module 4: Control	none	No label	n	y	y	y	y	y
1036	Encoder 1 Switch	S		Module 1: Control reset	none	No label	n	y	y	y	y	y
1037	Encoder 2 Switch	S		Module 2: Control reset	none	No label	n	y	y	y	y	y
1038	Encoder 3 Switch	S		Module 3: Control reset	none	No label	n	y	y	y	y	y
1039	Encoder 4 Switch	S		Module 4: Control reset	none	No label	n	y	y	y	y	y
1040	Switch 1.1	S + A	0	Module 1: Module preset 1A	none	1A	n	n	y	y	y	y
1041	Switch 2.1	S + A	0	Module 2: Module preset 1A	none	1A	n	n	y	y	y	y
1042	Switch 3.1	S + A	0	Module 3: Module preset 1A	none	1A	n	n	y	y	y	y
1043	Switch 4.1	S + A	0	Module 4: Module preset 1A	none	1A	n	n	y	y	y	y
1044	Switch 1.2	S + A	0	Module 1: Module preset 1B	none	1B	n	n	y	y	y	y
1045	Switch 2.2	S + A	0	Module 2: Module preset 1B	none	1B	n	n	y	y	y	y
1046	Switch 3.2	S + A	0	Module 3: Module preset 1B	none	1B	n	n	y	y	y	y
1047	Switch 4.2	S + A	0	Module 4: Module preset 1B	none	1B	n	n	y	y	y	y
1048	Switch 1.3	S + A	0	Module 1: Prog on/off	Prog	Buss1/2 on	n	y	y	y	y	y
1049	Switch 2.3	S + A	0	Module 2: Prog on/off	Prog	Buss1/2 on	n	y	y	y	y	y
1050	Switch 3.3	S + A	0	Module 3: Prog on/off	Prog	Buss1/2 on	n	y	y	y	y	y
1051	Switch 4.3	S + A	0	Module 4: Prog on/off	Prog	Buss1/2 on	n	y	y	y	y	y
1052	Switch 1.4	S + A	0	Module 1: Sub on/off	Sub	Buss3/4 on	n	y	y	y	y	y

Figure 25: Node object configuration (to Axum functions)

- **Default**
  The gray value is the startup default, this may be changed by assigning a custom value. When you submit an empty box the object returns to the startup default value.

- **Function**
  Here you may select which engine function is connected to the object

- **Label**
  Here you may change the label, which is a shortcut for the selected function, if none is given the default function label will be used *(the label will appear in the remote configuration software)*.

- **User level**
  Per user level you can overwrite the default level per function. If y is selected the function will be available in the selected user level. If n is selected the function won´t be available. if the y/n value is shown light gray, the function default user level is used.

  In the column headers you may toggle the user level for all objects in the node.

6.1.15 Rack configuration

You can see an overview of the cards in the rack on this page. You can find information like the slot number, MambaNet address, card name, number of inputs and outputs.
The link Configure will go to a page for connecting objects of the card to Axum engine's functions. You can consider this as the remote control configuration. For example you can connect:

- Start/stop functionality to remote outputs
- Source gain functionality to MIC gain
- Speaker level to CRM output level
- etc. etc.

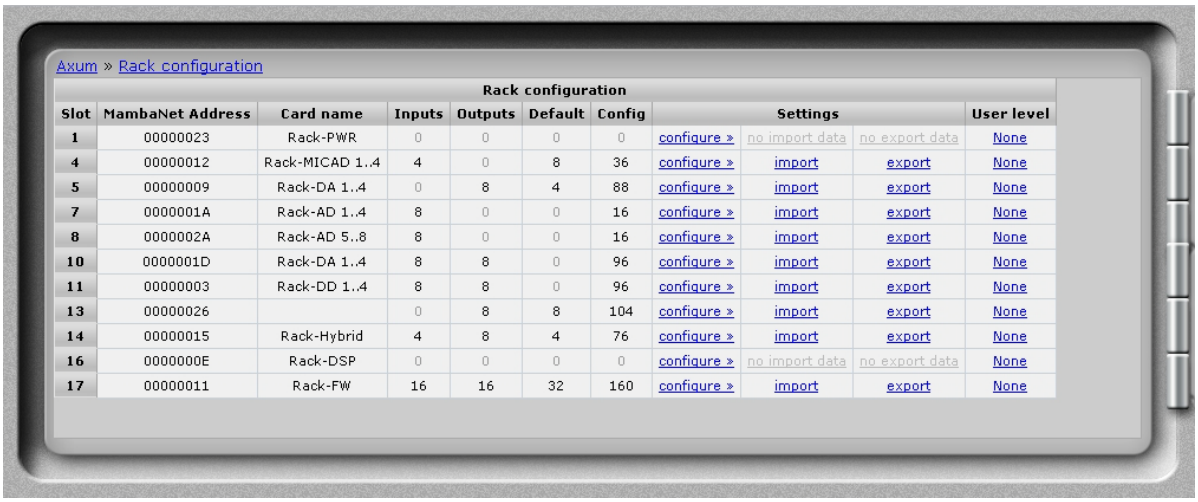


Figure 26: Rack configuration

- **Slot**
  Slot number where the I/O card is located.

- **MambaNet Address**
  Show information on the internal used MambaNet addresses

- Node **name**
  Logical name of the node

- **Inputs**
  Number of mono input channels

- **Outputs**
  Number of mono output channels

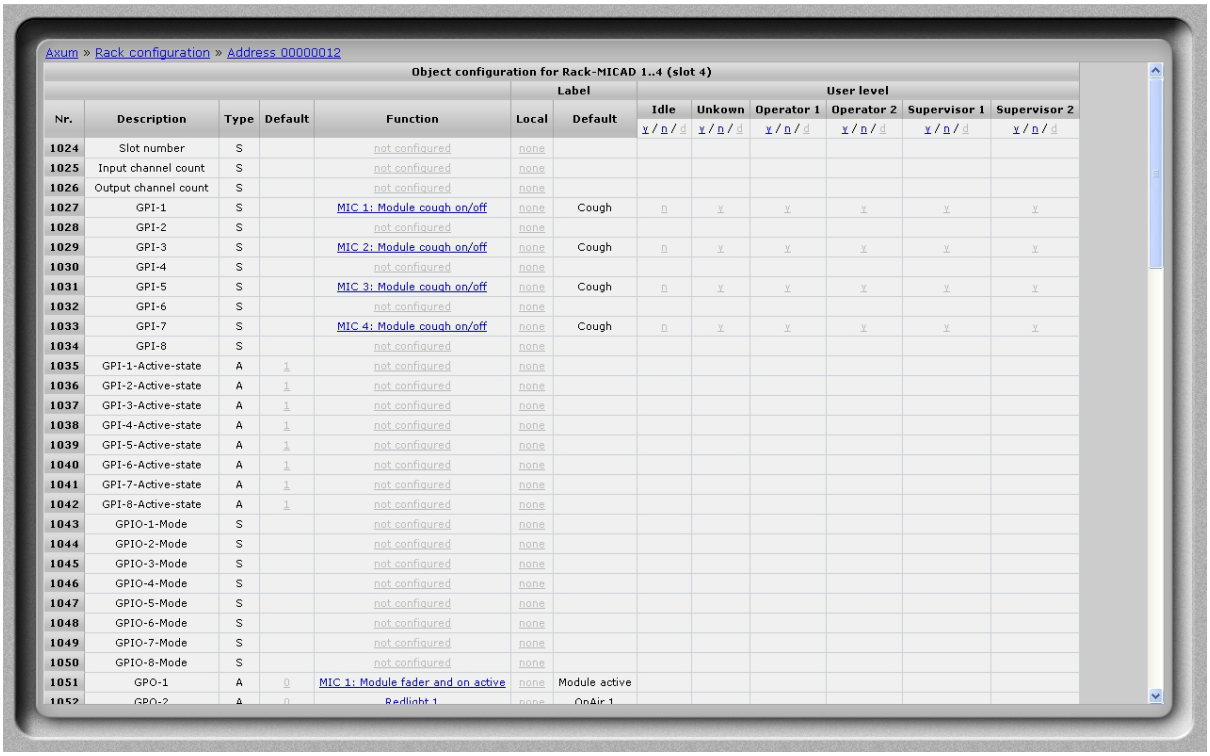
- **Default**
  Number of objects that have a default value set.

- **Config**
  Number of objects that are configured to an engine function.

- **Import/Export**
  Once you have configured the defaults and used engine functions you can export and import these settings. With export the current configuration is stored in the database, where you have to give a logical name (e.g. Module 5-8). With import you can restore a configuration to the same or a different node (of the same type). When you import Module 5-8 with an offset of -4 the configuration will be as you expect Module 1-4.

- **User level**
  Here you can define which console user level the I/O card will use (e.g. for its GPIs).

- **Configure**
  The page shown below gives an indication how the CRM output level objects connect to the Speaker level engine functions. By following the links, you can reconfigure the functions that connect to the objects. The sensor and actuator data types determine which function assigns to the object.
  For a complete list of the functions, you can look up chapter 20 Appendix C – Engine functions..



Axum » Rack configuration » Address 00000012

Object configuration for Rack-MICAD 1..4 (slot 4)

Nr.	Description	Type	Default	Function	Label: Local	Label: Default	User level: Idle	Unkown	Operator 1	Operator 2	Supervisor 1	Supervisor 2
							y / n / d	y / n / d	y / n / d	y / n / d	y / n / d	y / n / d
1024	Slot number	S		not configured	none							
1025	Input channel count	S		not configured	none							
1026	Output channel count	S		not configured	none							
1027	GPI-1	S		MIC 1: Module cough on/off	none	Cough	n	y	y	y	y	y
1028	GPI-2	S		not configured	none							
1029	GPI-3	S		MIC 2: Module cough on/off	none	Cough	n	y	y	y	y	y
1030	GPI-4	S		not configured	none							
1031	GPI-5	S		MIC 3: Module cough on/off	none	Cough	n	y	y	y	y	y
1032	GPI-6	S		not configured	none							
1033	GPI-7	S		MIC 4: Module cough on/off	none	Cough	n	y	y	y	y	y
1034	GPI-8	S		not configured	none							
1035	GPI-1-Active-state	A	1	not configured	none							
1036	GPI-2-Active-state	A	1	not configured	none							
1037	GPI-3-Active-state	A	1	not configured	none							
1038	GPI-4-Active-state	A	1	not configured	none							
1039	GPI-5-Active-state	A	1	not configured	none							
1040	GPI-6-Active-state	A	1	not configured	none							
1041	GPI-7-Active-state	A	1	not configured	none							
1042	GPI-8-Active-state	A	1	not configured	none							
1043	GPIO-1-Mode	S		not configured	none							
1044	GPIO-2-Mode	S		not configured	none							
1045	GPIO-3-Mode	S		not configured	none							
1046	GPIO-4-Mode	S		not configured	none							
1047	GPIO-5-Mode	S		not configured	none							
1048	GPIO-6-Mode	S		not configured	none							
1049	GPIO-7-Mode	S		not configured	none							
1050	GPIO-8-Mode	S		not configured	none							
1051	GPO-1	A	0	MIC 1: Module fader and on active	none	Module active						
1052	GPO-2	A	0	Redlight 1	none	OnAir 1						

Figure 27: Node object configuration (to Axum functions)

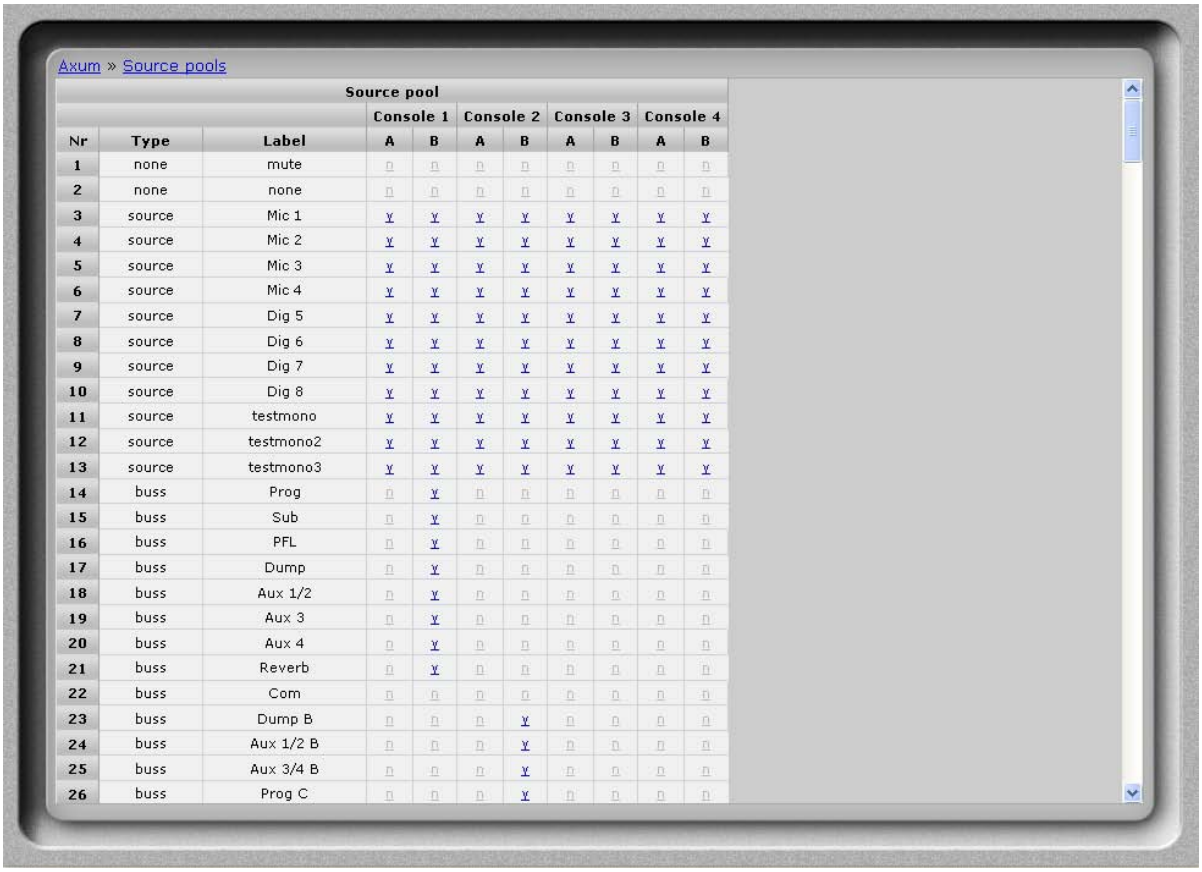
- **Label**
  Here you may change the label, which is a shortcut for the selected function, if none is given the default function label will be used *(the label will appear in the remote configuration software)*.

- **User level**
  Per user level you can overwrite the default level per function. If y is selected the function will be available in the selected user level. If n is selected the function won´t be available. if the y/n value is shown light gray, the function default user level is used.

  In the column headers you may toggle the user level for all objects in the node.

6.1.16 Source pools

You can see an overview of the source pools on this page. A source pool may be assigned to a user to give them a comfortable source list for selection from the control surface.



Source pool

			Console 1		Console 2		Console 3		Console 4	
Nr	Type	Label	A	B	A	B	A	B	A	B
1	none	mute	n	n	n	n	n	n	n	n
2	none	none	n	n	n	n	n	n	n	n
3	source	Mic 1	y	y	y	y	y	y	y	y
4	source	Mic 2	y	y	y	y	y	y	y	y
5	source	Mic 3	y	y	y	y	y	y	y	y
6	source	Mic 4	y	y	y	y	y	y	y	y
7	source	Dig 5	y	y	y	y	y	y	y	y
8	source	Dig 6	y	y	y	y	y	y	y	y
9	source	Dig 7	y	y	y	y	y	y	y	y
10	source	Dig 8	y	y	y	y	y	y	y	y
11	source	testmono	y	y	y	y	y	y	y	y
12	source	testmono2	y	y	y	y	y	y	y	y
13	source	testmono3	y	y	y	y	y	y	y	y
14	buss	Prog	n	y	n	n	n	n	n	n
15	buss	Sub	n	y	n	n	n	n	n	n
16	buss	PFL	n	y	n	n	n	n	n	n
17	buss	Dump	n	y	n	n	n	n	n	n
18	buss	Aux 1/2	n	y	n	n	n	n	n	n
19	buss	Aux 3	n	y	n	n	n	n	n	n
20	buss	Aux 4	n	y	n	n	n	n	n	n
21	buss	Reverb	n	y	n	n	n	n	n	n
22	buss	Com	n	n	n	n	n	n	n	n
23	buss	Dump B	n	n	n	y	n	n	n	n
24	buss	Aux 1/2 B	n	n	n	y	n	n	n	n
25	buss	Aux 3/4 B	n	n	n	y	n	n	n	n
26	buss	Prog C	n	n	n	y	n	n	n	n

Figure 28: Source pool configuration

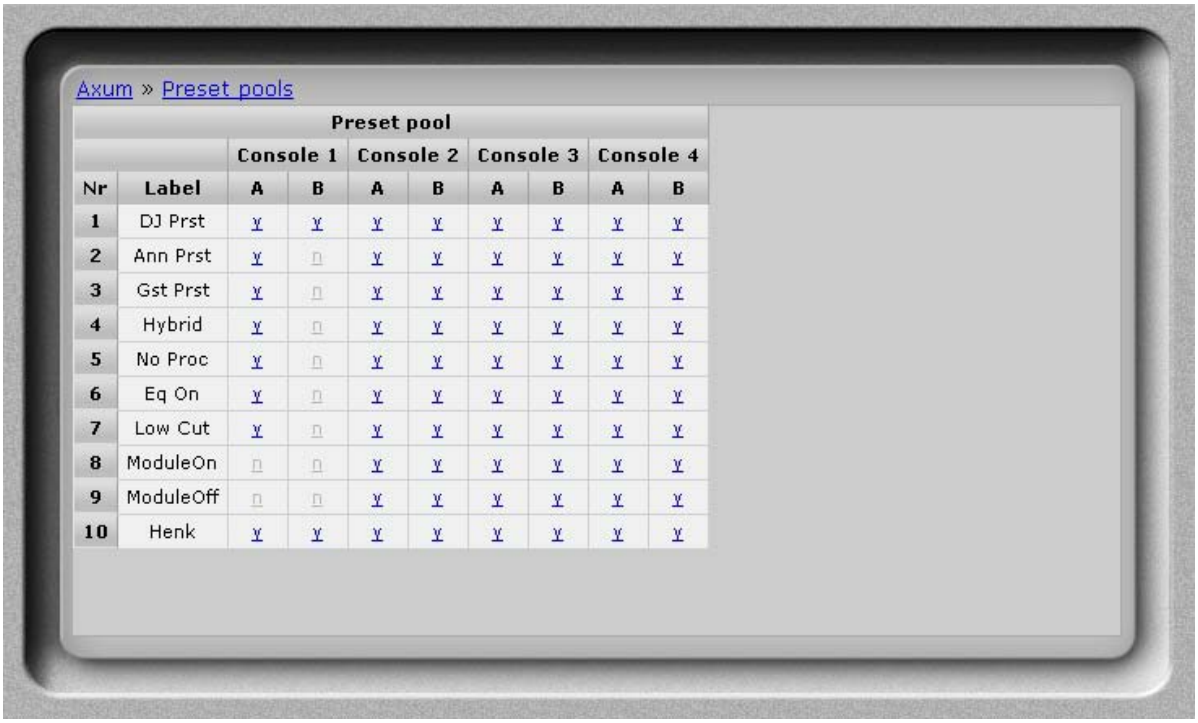
- **Type**
  Type of the source.

- **Label**
  Name of the source.

- **Source pool**
  Per console there are 2 source pools A/B
  If y is selected the source will be available in the selected source pool. If n is selected the source won´t be available.

6.1.17 Preset pools

You can see an overview of the preset pools on this page. A preset pool may be assigned to a user to give them a comfortable source list for selection from the control surface.



		Preset pool							
		Console 1		Console 2		Console 3		Console 4	
Nr	Label	A	B	A	B	A	B	A	B
1	DJ Prst	y	y	y	y	y	y	y	y
2	Ann Prst	y	n	y	y	y	y	y	y
3	Gst Prst	y	n	y	y	y	y	y	y
4	Hybrid	y	n	y	y	y	y	y	y
5	No Proc	y	n	y	y	y	y	y	y
6	Eq On	y	n	y	y	y	y	y	y
7	Low Cut	y	n	y	y	y	y	y	y
8	ModuleOn	n	n	y	y	y	y	y	y
9	ModuleOff	n	n	y	y	y	y	y	y
10	Henk	y	y	y	y	y	y	y	y

Figure 29: Preset pool configuration

- **Label**
  Name of the preset.

- **Preset pool**
  Per console there are 2 preset pools A/B
  If y is selected the preset will be available in the selected preset pool. If n is selected the preset won´t be available.

6.1.18 Users

You can see an overview of the users on this page. You can see the user level/preset per user and per console.

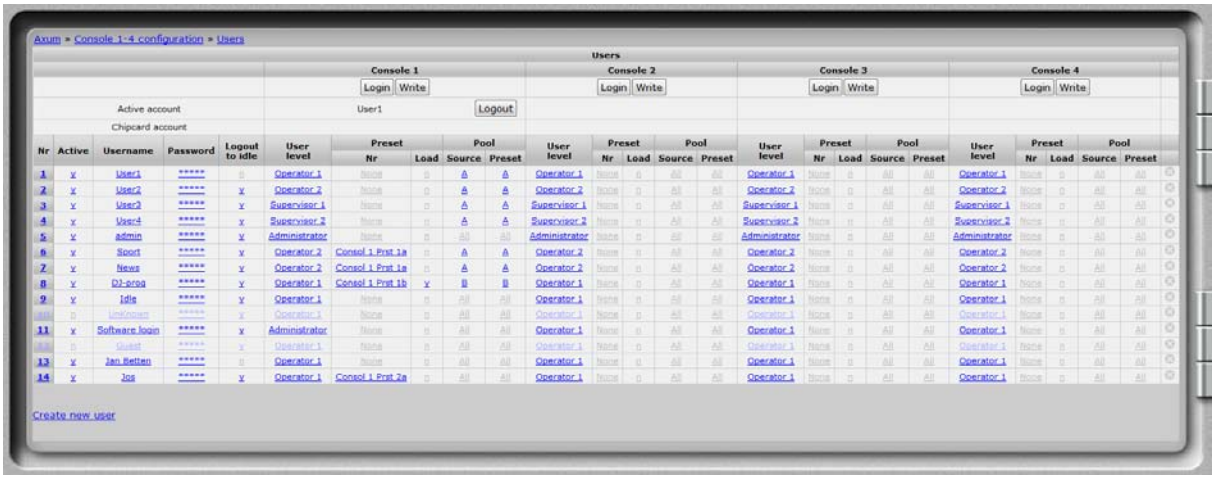


Figure 30: User configuration

- **Login**
  Here you can login as a user to the selected console.

- **Write**
  Here you can write the selected user to a plugged in chipcard.

- **Active account**
  The account that is currently active in this console (this may be different from the chipcard if overruled by software).

- **Chipcard account**
  The name of the user of a plugged in chipcard, will appear here.

- **Add**
  With this button you can add the user from a chipcard to the AXUM system.

- **Nr**
  Here you can reposition the user to make the list in a convenient order.

- **Active**
  You may disable an account using this switch**.**

- **Username**
  Here you can enter the name of the user.

- **Password**
  Here you can enter the password of the user.

- **Logout to idle**
  Removal of the chipcard can be used to stay in the last user or to jump to the idle situation.

- **User level**
  Here you can select the user level of the user (see also 6.1.14 Surface configuration and 6.1.15 Rack configuration)

- **Console preset**
  It is possible to select a console preset which will be loaded if the user logs in.

- **Pool**
  Per console you can select which preset and which source pool the user may use. Per pool you can choose between A, B or all. (see also 6.1.16 Source pools and 6.1.17 Preset pools)

- **Delete**
  When you click on this column the user will be deleted.

Create new user
By clicking on this link a popup will appear where you have to setup the username and password for the new user.

6.2 System configuration

If you browse to the url http://192.168.0.200/system (where 192.168.0.200 should be your local AXUM IP address) you have a system menu with give some management/service possibilities.

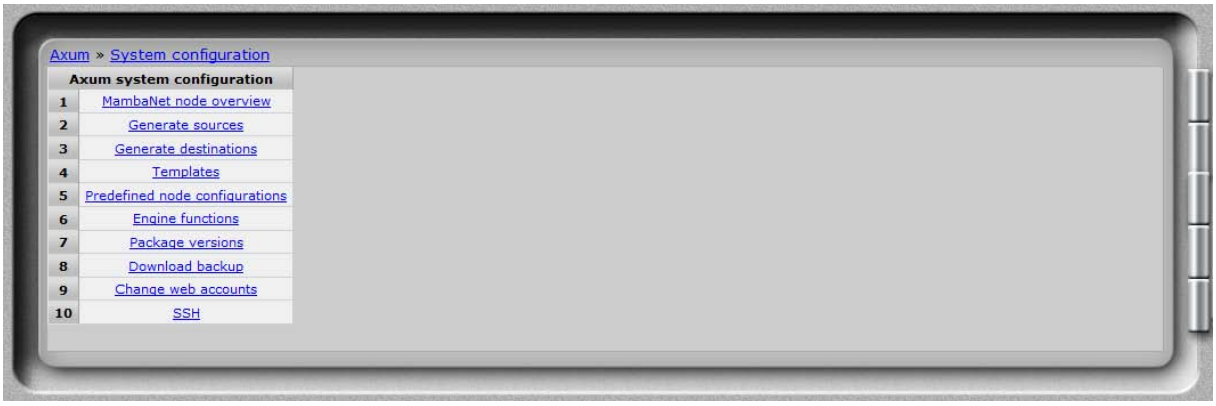


Figure 31: Service menu

- **MambaNet node overview**
  Will show all nodes that are found in the local Ethernet network.

- **Generate sources**
  WARNING: this function deletes all sources and their configuration.
  After all sources are deleted, it will generate new sources regarding the 'rack layout' found.

- **Generate destinations**
  WARNING: this function deletes all destinations and their configuration.
  After all sources are deleted, it will generate new sources regarding the 'rack layout' found.

- **Templates**
  Shows a list of all known node types. The learner did read these templates from the nodes.

- **Predefined node configurations**
  Shows a list of configurations stored by the export function in surface/rack configuration.

- **Engine functions**
  Shows a list of all engine functions available.

- **Package versions**
  Shows the packages, version and build/install date.

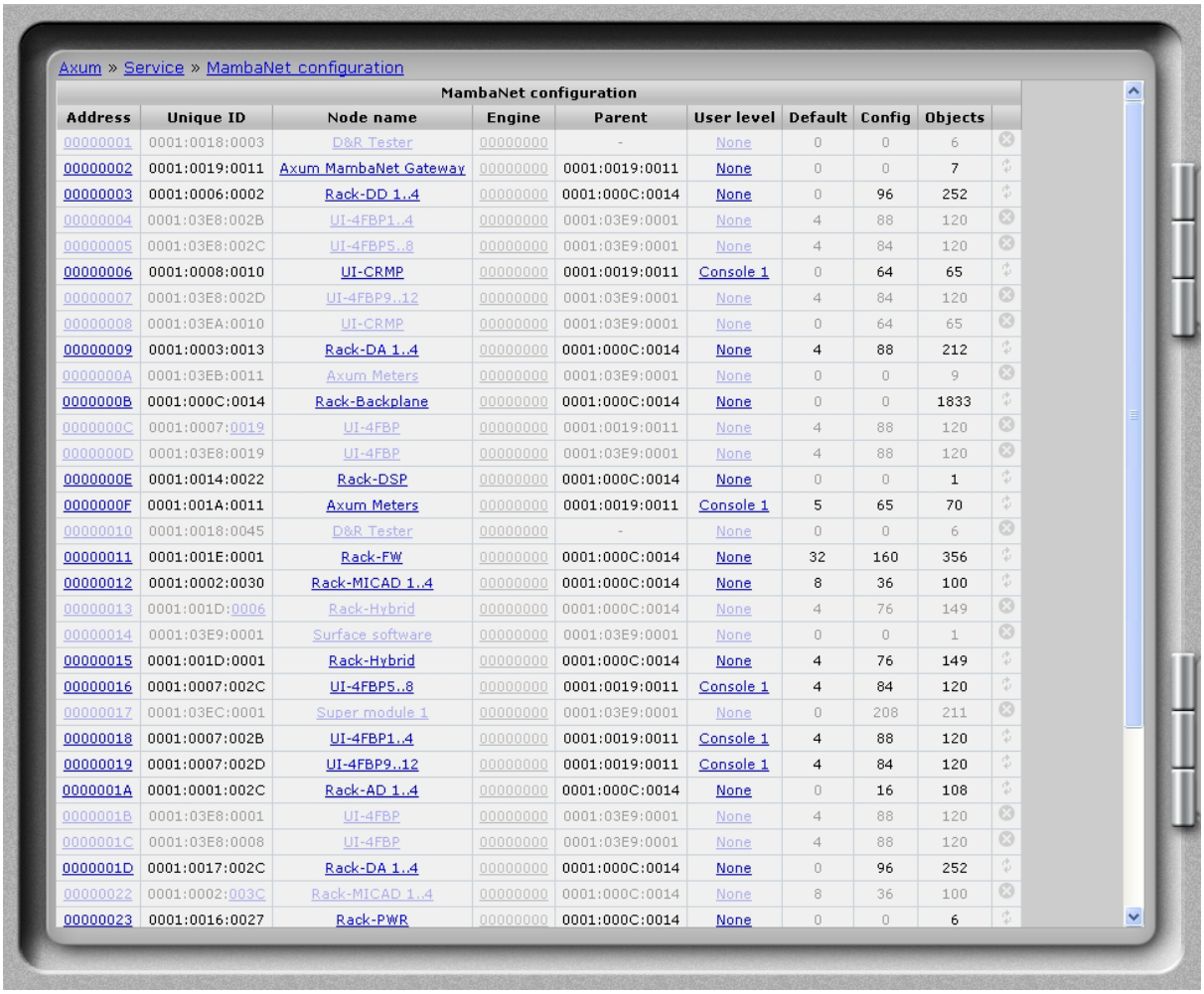
- **Download backup**
  Downloads a file which is a complete image of the internal flash disk (under development).

- **Change web accounts**
  Here you can change the password for the webserver console configuration and system configuration.

- **SSH**
  Here the SSH server (port 22) may be disabled or enabled for remote service.

6.2.1 MambaNet node overview

This pages shows all nodes found in the local Ethernet network. Also nodes that are not online can be seen as 'grayed out' nodes.



Address	Unique ID	Node name	Engine	Parent	User level	Default	Config	Objects
00000001	0001:0018:0003	D&R Tester	00000000	-	None	0	0	6
00000002	0001:0019:0011	Axum MambaNet Gateway	00000000	0001:0019:0011	None	0	0	7
00000003	0001:0006:0002	Rack-DD 1..4	00000000	0001:000C:0014	None	0	96	252
00000004	0001:03E8:002B	UI-4FBP1..4	00000000	0001:03E9:0001	None	4	88	120
00000005	0001:03E8:002C	UI-4FBP5..8	00000000	0001:03E9:0001	None	4	84	120
00000006	0001:0008:0010	UI-CRMP	00000000	0001:0019:0011	Console 1	0	64	65
00000007	0001:03E8:002D	UI-4FBP9..12	00000000	0001:03E9:0001	None	4	84	120
00000008	0001:03EA:0010	UI-CRMP	00000000	0001:03E9:0001	None	0	64	65
00000009	0001:0003:0013	Rack-DA 1..4	00000000	0001:000C:0014	None	4	88	212
0000000A	0001:03EB:0011	Axum Meters	00000000	0001:03E9:0001	None	0	0	9
0000000B	0001:000C:0014	Rack-Backplane	00000000	0001:000C:0014	None	0	0	1833
0000000C	0001:0007:0019	UI-4FBP	00000000	0001:0019:0011	None	4	88	120
0000000D	0001:03E8:0019	UI-4FBP	00000000	0001:03E9:0001	None	4	88	120
0000000E	0001:0014:0022	Rack-DSP	00000000	0001:000C:0014	None	0	0	1
0000000F	0001:001A:0011	Axum Meters	00000000	0001:0019:0011	Console 1	5	65	70
00000010	0001:0018:0045	D&R Tester	00000000	-	None	0	0	6
00000011	0001:001E:0001	Rack-FW	00000000	0001:000C:0014	None	32	160	356
00000012	0001:0002:0030	Rack-MICAD 1..4	00000000	0001:000C:0014	None	8	36	100
00000013	0001:001D:0006	Rack-Hybrid	00000000	0001:000C:0014	None	4	76	149
00000014	0001:03E9:0001	Surface software	00000000	0001:03E9:0001	None	0	0	1
00000015	0001:001D:0001	Rack-Hybrid	00000000	0001:000C:0014	None	4	76	149
00000016	0001:0007:002C	UI-4FBP5..8	00000000	0001:0019:0011	Console 1	4	84	120
00000017	0001:03EC:0001	Super module 1	00000000	0001:03E9:0001	None	0	208	211
00000018	0001:0007:002B	UI-4FBP1..4	00000000	0001:0019:0011	Console 1	4	88	120
00000019	0001:0007:002D	UI-4FBP9..12	00000000	0001:0019:0011	Console 1	4	84	120
0000001A	0001:0001:002C	Rack-AD 1..4	00000000	0001:000C:0014	None	0	16	108
0000001B	0001:03E8:0001	UI-4FBP	00000000	0001:03E9:0001	None	4	88	120
0000001C	0001:03E8:0008	UI-4FBP	00000000	0001:03E9:0001	None	4	88	120
0000001D	0001:0017:002C	Rack-DA 1..4	00000000	0001:000C:0014	None	0	96	252
00000022	0001:0002:003C	Rack-MICAD 1..4	00000000	0001:000C:0014	None	8	36	100
00000023	0001:0016:0027	Rack-PWR	00000000	0001:000C:0014	None	0	0	6

Figure 32: MambaNet node overview

- **Address**
  This is the MambaNet address used in this setup. This address is used for all communication and configuration.

- **UniqueID**
  This shows the 'ManufacturerID:ProductID:UniqueID' in hexadecimal format. When a node is offline you will see the 'UniqueID' is a link. This can be used to transfer the configuration of the offline node to another online node of the same type.

- **Node name**
  Here you can change a node name to a logical correct name, this makes identification in the system easier.

- **Engine**
  If you use multiple engines into a single Ethernet you can give here which engine is used by the node. Address '00000000' means the node communicates with all engines in parallel;

which is most easy for systems with only one engine.

- **Parent**
  Easy node can store its parent node so we can determine the physical-location of nodes.

- **User level**
  Here you can define which console user level the node will use.

- **Default, Config and Objects**
  This column shows the numbers of objects and how many have a default value or configuration

- **Delete/Refresh**
  Grayed out nodes may be deleted by pressing the delete image.
  WARNING: When a node is deleted the configuration is also removed!

  Only nodes do not have a delete image, but a refresh image. This can be used to force a refresh of the node name and parent.

6.2.2 Templates

The learner continuously checks for unknown nodes. When a unknown node is found it will read the object information and store it in the database. A template is unique by:
ManufactureID, ProductID and Major Firmware Revision.

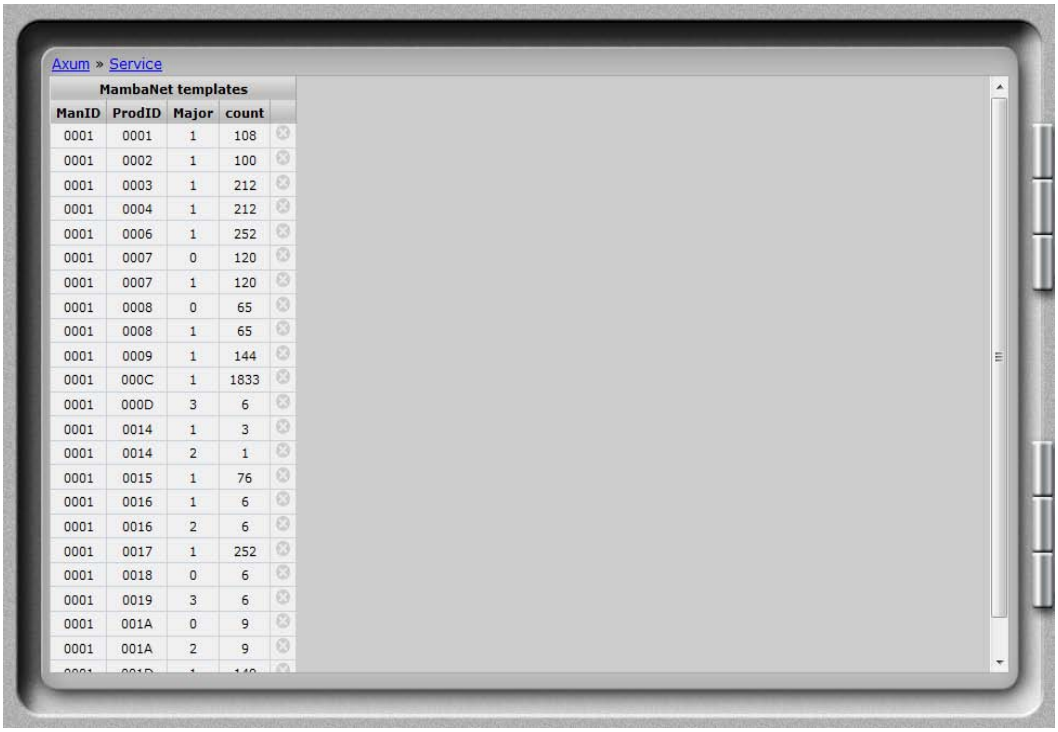


Figure 33: Node templates

- **Count**
  Shows the number of objects that are located in this template.

- **Delete**
  When because of a failure a template is wrong you may delete it so the learner will read the information again.

6.2.3 Predefined node configurations

The configurations that are exported are listed here. When you mistakenly did export a configuration you may delete it from here.

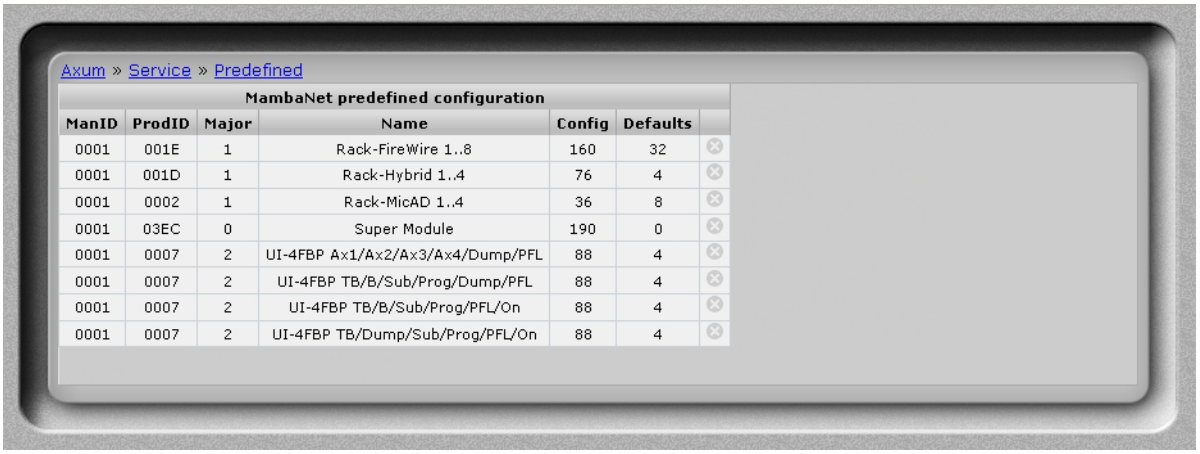


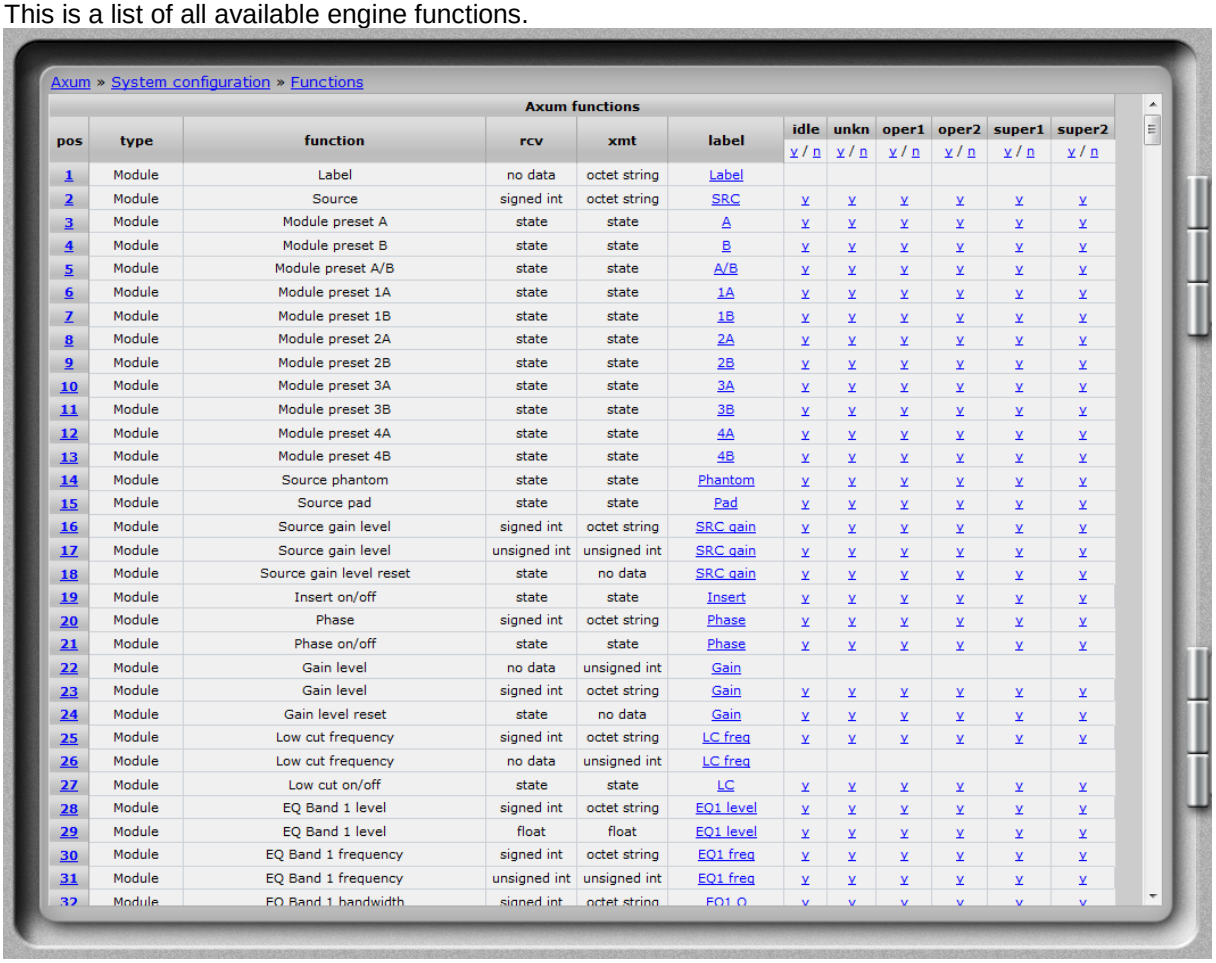
Figure 34: Stored configurations

- **Config**
  Config gives the number of configured objects that are stored.

- **Default**
  Default gives the number of configured defaults that are stored.

6.2.4 Engine functions

This is a list of all available engine functions.



Axum » System configuration » Functions

Axum functions

pos	type	function	rcv	xmt	label	idle y / n	unkn y / n	oper1 y / n	oper2 y / n	super1 y / n	super2 y / n
1	Module	Label	no data	octet string	Label						
2	Module	Source	signed int	octet string	SRC	y	y	y	y	y	y
3	Module	Module preset A	state	state	A	y	y	y	y	y	y
4	Module	Module preset B	state	state	B	y	y	y	y	y	y
5	Module	Module preset A/B	state	state	A/B	y	y	y	y	y	y
6	Module	Module preset 1A	state	state	1A	y	y	y	y	y	y
7	Module	Module preset 1B	state	state	1B	y	y	y	y	y	y
8	Module	Module preset 2A	state	state	2A	y	y	y	y	y	y
9	Module	Module preset 2B	state	state	2B	y	y	y	y	y	y
10	Module	Module preset 3A	state	state	3A	y	y	y	y	y	y
11	Module	Module preset 3B	state	state	3B	y	y	y	y	y	y
12	Module	Module preset 4A	state	state	4A	y	y	y	y	y	y
13	Module	Module preset 4B	state	state	4B	y	y	y	y	y	y
14	Module	Source phantom	state	state	Phantom	y	y	y	y	y	y
15	Module	Source pad	state	state	Pad	y	y	y	y	y	y
16	Module	Source gain level	signed int	octet string	SRC gain	y	y	y	y	y	y
17	Module	Source gain level	unsigned int	unsigned int	SRC gain	y	y	y	y	y	y
18	Module	Source gain level reset	state	no data	SRC gain	y	y	y	y	y	y
19	Module	Insert on/off	state	state	Insert	y	y	y	y	y	y
20	Module	Phase	signed int	octet string	Phase	y	y	y	y	y	y
21	Module	Phase on/off	state	state	Phase	y	y	y	y	y	y
22	Module	Gain level	no data	unsigned int	Gain						
23	Module	Gain level	signed int	octet string	Gain	y	y	y	y	y	y
24	Module	Gain level reset	state	no data	Gain	y	y	y	y	y	y
25	Module	Low cut frequency	signed int	octet string	LC freq	y	y	y	y	y	y
26	Module	Low cut frequency	no data	unsigned int	LC freq						
27	Module	Low cut on/off	state	state	LC	y	y	y	y	y	y
28	Module	EQ Band 1 level	signed int	octet string	EQ1 level	y	y	y	y	y	y
29	Module	EQ Band 1 level	float	float	EQ1 level	y	y	y	y	y	y
30	Module	EQ Band 1 frequency	signed int	octet string	EQ1 freq	y	y	y	y	y	y
31	Module	EQ Band 1 frequency	unsigned int	unsigned int	EQ1 freq	y	y	y	y	y	y
32	Module	EQ Band 1 bandwidth	signed int	octet string	EQ1 Q	y	y	y	y	y	y

Figure 35: Engine functions

- **Pos**
  Here it is possible to reposition the functions for easier/faster access in the surface/rack configuration menu's

- **Type**
  Shows the group the functions belongs to and determines which number range is used.
  - Module: 1-128
  - Busses: 1-16
  - Monitor busses: 1-16
  - Global: 0
  - Source: 1-1280
  - Destination: 1-1280

- **Function**
  Is the description of the engine function

- **Rcv**
  The receive column shows which datatype is required at the object-sensor to be able to control this functions.

- **Xmt**
  The transmit column shows which datatype is required at the object-actuator to be able to receive data from the engine.

- **Label**
  This label will be used if default function label for remote software applications. It can be changed here globally. In the surface/rack configuration you may give labels per configured object-function.

- **User levels**
  For each user level you can select the default state, if 'y' this function can be used for this user level, if 'n' this functions can not be used for this user level. The function default setting can be overruled in the node configuration.

6.2.5 Package versions

This page shows the installed packages with their version number, build and install date.

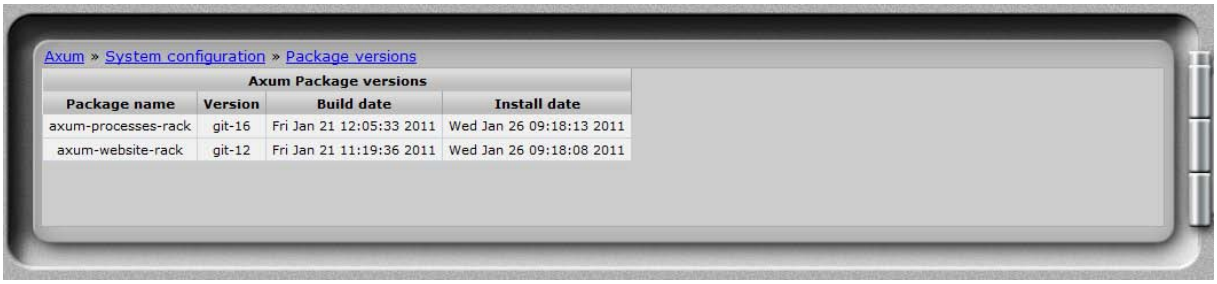


Figure 36: Package versions

6.2.6 Change web accounts

The webserver requires authentication. On this page you change the username and password.

Figure 37: Change password

7 Surface(s) website

To set the time displayed in the meter of the console.
Simply enter the IP address of the console in your browser and log-on to the configuration pages.

By default the IP Address is: **http://192.168.0.234**
(at first time startup you can use a network or cross wire with a static IP given to your network interface, e.g. 192.168.0.10).

On the console website, you find the ip/clock configuration:

Figure 38: Console website

7.1 IP/Clock configuration

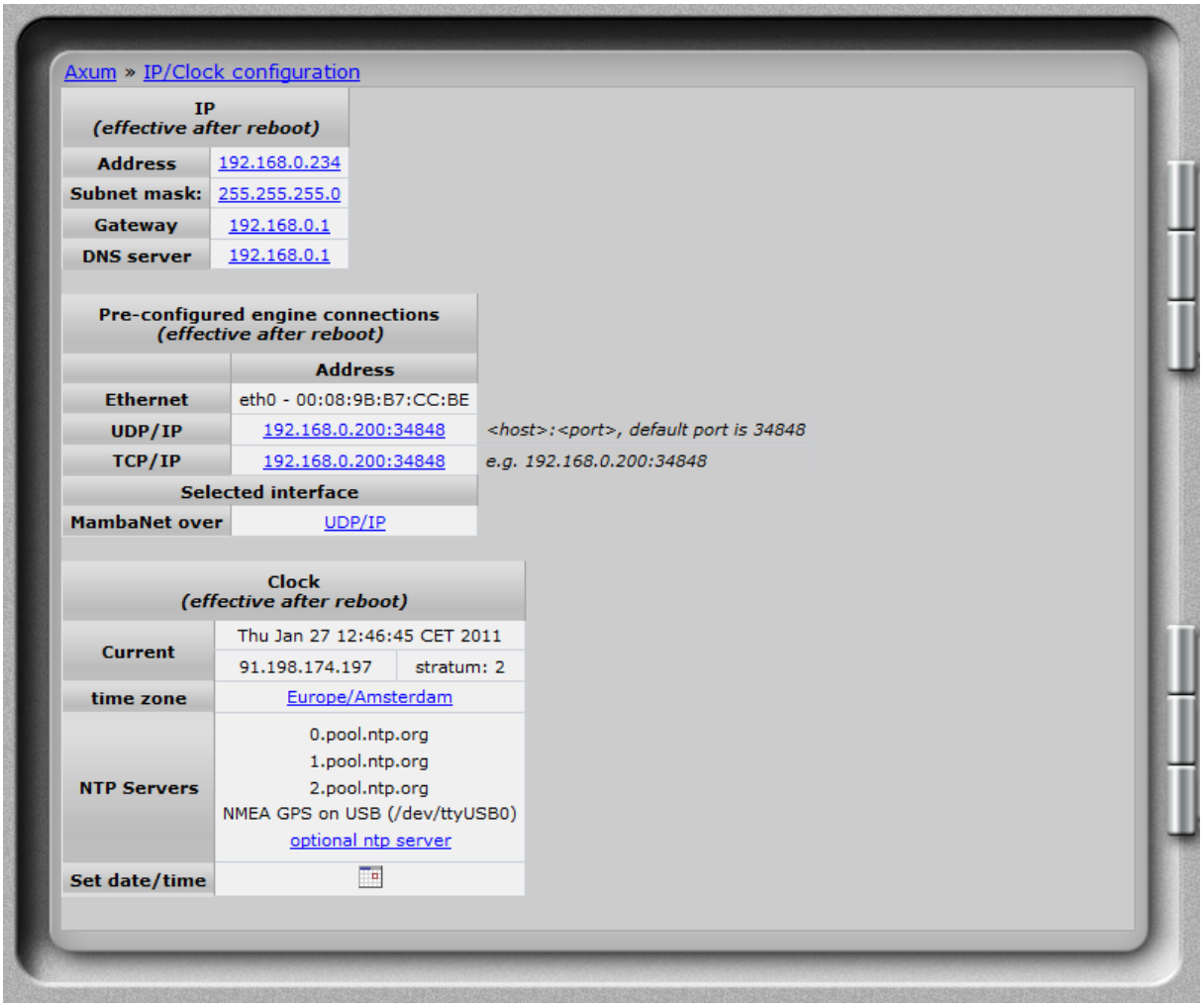


Figure 39: IP/Clock configuration

7.1.1.1 IP

Here you can setup the network settings to be compatible with the required settings in your situation and you can set the time zone to where you are.

It's possible to change the IP, subnet, gateway and DNS server address by clicking on the address. For more information on IP addressing:
http://en.wikipedia.org/wiki/IP_address

7.1.1.2 Pre-configured engine connections

An surface may connect to a rack via different protocols, here you may select the destination IP and port to connect to.

In the field 'MambaNet over' you select the protocol to use, where Ethernet may be used in a LAN (with only one rack) and UDP or TCP may be used in LAN and WAN; even with multiple consoles hooked up in the LAN (They should have 'MambaNet over Ethernet' enabled).

7.1.1.3 Clock

To change the time zone, click on the used time zone (in our example ‘Europe/Amsterdam’). You can select the desired time zone in the list box.

The AXUM uses the NTP protocol for accurate clock synchronization. In the section ‘current’ you find the IP address of the used ‘clock master’ and its ‘stratum’. For more information on NTP: http://en.wikipedia.org/wiki/Network_Time_Protocol

When IP and DNS settings are setup correct, the AXUM will automatically synchronize to a pool of time servers. The AXUM is also able to use a GPS receiver via USB for time synchronization. next, the AXUM may function as a NTP server for the surfaces. There for, on the webserver of the control surfaces you can configure the 'optional ntp server' and fill in the IP address of the ntp server (e.g. 192.168.0.200).

Set date/time may be used on system without any synchronization to set the correct time.
In the popup window it is possible to give to correct time and if you click on the ‘day’ it will become direct changed/activated.

Remember that all other changes (NTP and IP settings) will become effective after reboot.

8 Block diagrams – Must be created

With all configuration options, it is possible to make many different systems using a single I/O rack. We will show some example block diagrams on possible setups within an Axum system.

32 stereo module, 16 stereo buss and 4 stereo monitor buss console:

Note:
These diagrams will follow in future manuals, sorry

9 I/O Rack description

The AXUM digital audio system has a 19” rack (for 21 slots) that requires at least one power supply (3 slots) and one engine card (2 slots). You then have space for a maximum of 16 in and output cards. Because the AXUM is a modular system it is up to you how many in and output cards are necessary to do the job.

For the connections, we use standard RJ45; an example for other connectors is ADAT that uses the well-known ADAT optical connector. Connection between de RJ45s in the rack and your patch units is by standard STP (Shielded Twisted Pair) cable.

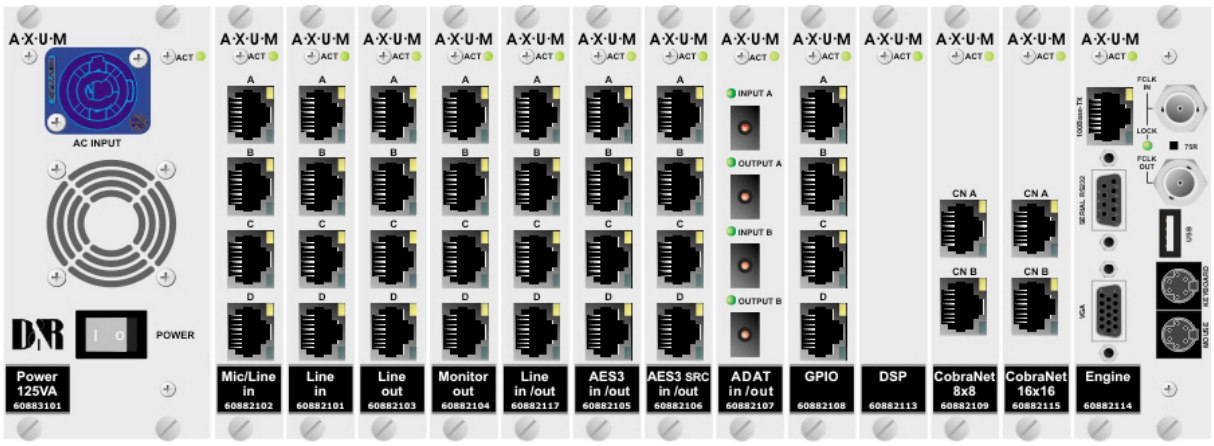
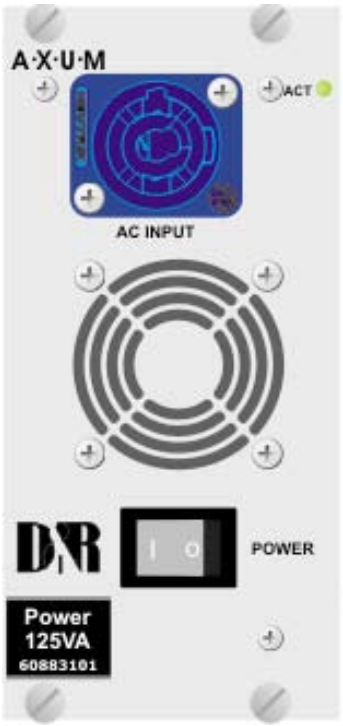


Figure 40: AXUM Digital audio system 19” Rack

9.1 Power supply



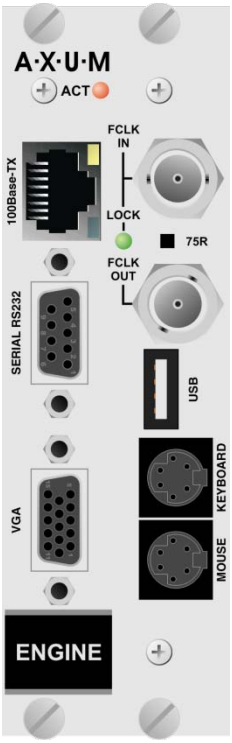
At the far left in the I/O RACK is the position where the power supply Card is inserted; an optional second power supply card can be inserted alongside this first one. With two power supplies, you have created automatic power supply redundancy.

The LED will blink green to show the power supply is up and running. At failure of the local power, this LED activity will be blinking red or not blinking at all.

The NEUTRIK™ PowerCON™ will feed 100-240V power to the supply. With the power switch you can turn off the local power supply.

WARNING:
Before you insert a second power supply please turn on the power of this second unit first to make sure you will not short the internal power-lines.

9.2 Engine



The engine is the controller card of the AXUM Digital audio system. This card has a fixed location at the far right side. For proper functioning of the system, you absolutely have to insert this card to your digital audio systems network.

The RJ45 is a default 100Mbit Ethernet port and over this network connection, the following information is send:

- MambaNet: control protocol
- HTTP: Configuration of your engine via web server
- FTP: Firmware/configuration update and backup via a file server.

Currently, the serial RS232, VGA, Keyboard, mouse and USB connection can be used for service purposes only.

Via the BNC connectors you synchronize this entire rack to an external frame clock as well as to remote equipment with the clock of this 19”rack.
With the 75R switch, you can turn on/off a 75-Ohm termination on the receiving frame clock connector.

The ACT(ive) LED will blink to show proper functioning of the Engine card.

On the next page, you find the pin information for all the connectors:

Pin	Pin name	Function	Comment
1	Centre	Frame Clock in	32kHz, 44.1kHz, 48kHz, +/- 100ppm, +5V TTL, switchable 75Ohm terminator.
GND	GND	Ground Frame Clock in	

Table 9-1: Frame clock input BNC

Pin	Pin name	Function	Comment
1	Centre	Frame Clock Out	32kHz, 44.1kHz, 48kHz, +5V TTL, imp.: 75Ohm
GND	GND	Ground Frame Clock out	

Table 9-2: Frame clock output BNC

Pin	Pin name	Function	Comment
1	Red	Red Video Out	Red Video
2	Green	Green Video Out	Green Video
3	Blue	Blue Video Out	Blue Video
4	nc		
5	GND Hsync	GND Horizontal Sync	
6	Red_RTN	Red Video Return	Red Video
7	Green_RTN	Green Video Return	Green Video
8	Blue_RTN	Blue Video Return	Blue Video
9	+5V	Power DDC	DCC
10	GND	GND (Vsync, DCC)	Ground
11	nc		
12	DDDA	Data DDC	DCC
13	Hsync	Horizontal Sync	Horizontal Sync
14	Vsync	Vertical Sync	Vertical Sync
15	DDCK	CLK DDC	DCC
S	Shield	Ground	

Table 9-3: VGA 15p D-Sub connector

Pin	Pin name	Function	Comment
1	KB Data	Keyboard/Mouse Data	Keyboard/Mouse Connection
5	KB CLK	Keyboard/Mouse CLK	
2			not connected
6			
4	PWR	+5V Power	Power Connection
3	GND	Ground	
S	Shield	Ground	Ground

Table 9-4: Keyboard & Mouse mini DIN connector

Pin	Pin name	Function	Comment
1a/b	VBUS	+5V Power	Supply power
2a/b	nUSB	USB Data outface	USB
3a/b	USB	USB Data inface	
4a/b	GND	Ground	Ground
S	Shield	Ground	Ground

Table 9-5: USB connector (2x)

Pin	Pin name	Function
1	DCD	Carrier Detect
6	DSR	Data Set Ready
2	RD	Receive Data
7	RTS	Request To Send
3	TD	Transmit Data
8	CTS	Clear To Send
4	DTR	Data Terminal Ready
9	RI	Ring Indicator
5	GND	Ground
S	Shield	Ground

Table 9-6: RS232 9pin SUB-D connector

Pin	Con.	Pair	Pin name	Function	Comment
1	1A	1	TX +	Ethernet	Ethernet TX 10/100BASE-T
2	1B		TX -	Ethernet	
3	2A	2	RX+	Ethernet	Ethernet RX 10/100BASE-T
6	2B		RX-	Ethernet	
5	3A	3	NC		
4	3B		NC		
7	4A	4	NC		
8	4B		NC		
S	GND	S	Shield	GND	Ground

Table 9-7: Ethernet RJ45 connection

9.3 GPIO

In rack configuration you can connect objects of MambaNet nodes to AXUM engine functions. Here you can also configure the GPIO objects of your I/O cards (MambaNet nodes). By following the links, you can reconfigure the functions that connect to the objects. The sensor and actuator data types determine which function assigns to the object.
For a complete list of the functions, you can look up chapter 20 Appendix C – Engine functions.

9.3.1 GPI

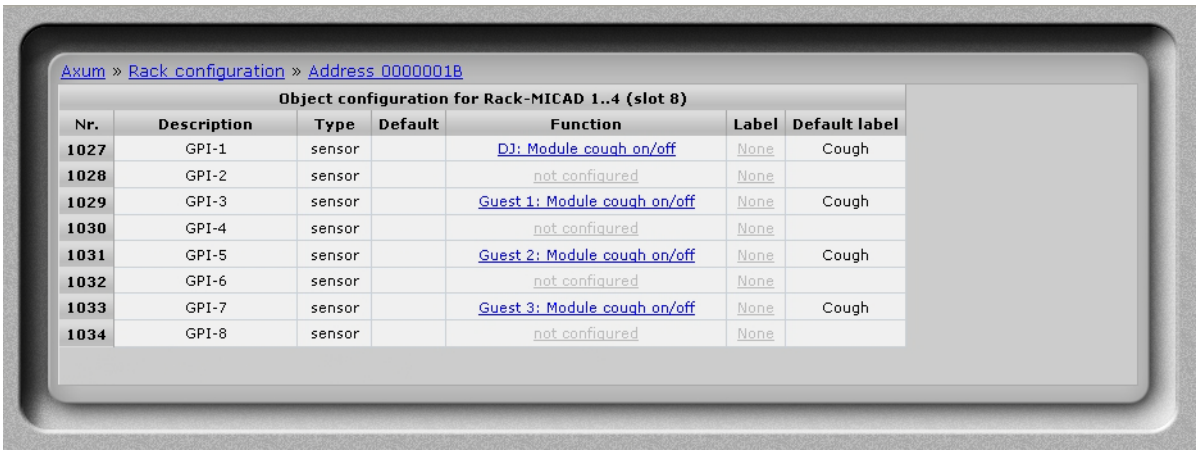


Figure 41: GPI configuration

- **Function**
  Here you may select which engine function is connected to the object. To use the GPI functions you must select the hardware jumper setting TLL mode on the board (see chapter 11.3.1 GPIO TTL/Relay selection). The default jumper setting is GPO-Relay for all cards except for the MIC input card. The default jumper setting for the MIC input card is GPIO-TTL for GPIO 1, 3, 5 and 7 and GPO-Relay for GPIO 2, 4, 6 and 8.

9.3.2 GPI Active-state

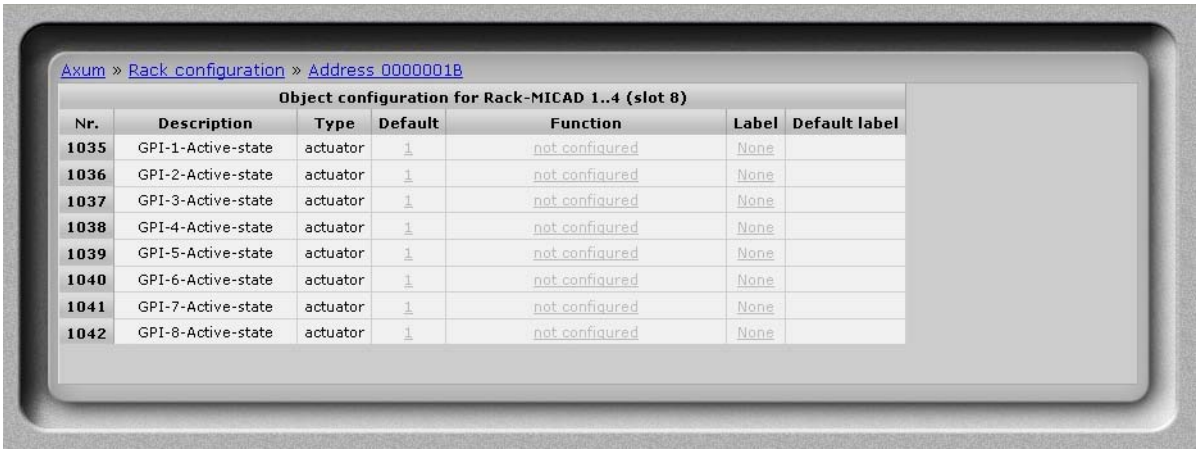
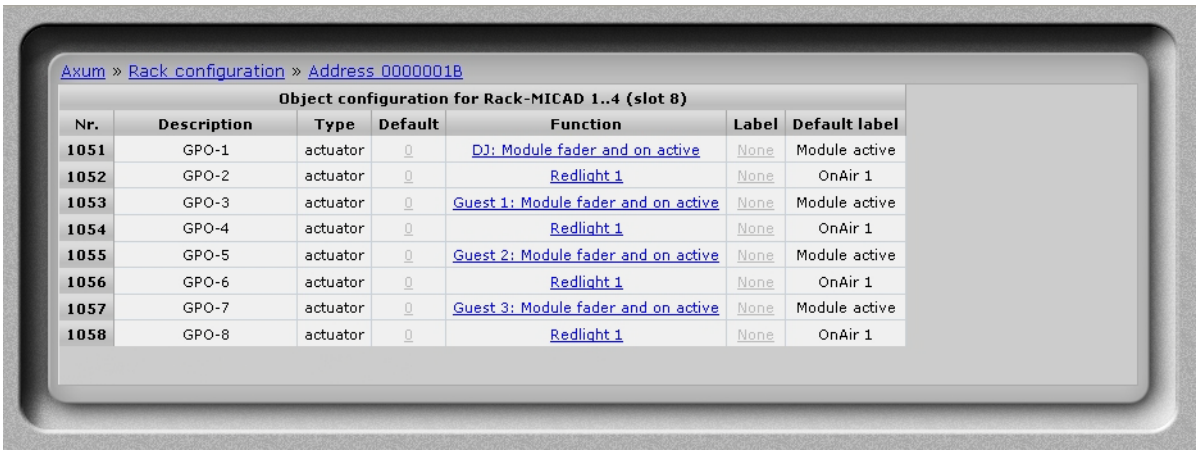


Figure 42: GPI Active-state configuration

- **Default**
  The gray value ‘1’ is the startup default, this may be changed by assigning a custom value (0

or 1). A value of '1' makes sure that if the GPI is +5V the function is made active. The value '0' makes sure that if the GPI is 0V the function is made active.
When you submit an empty box the object returns to the startup default value.

9.3.3 GPO



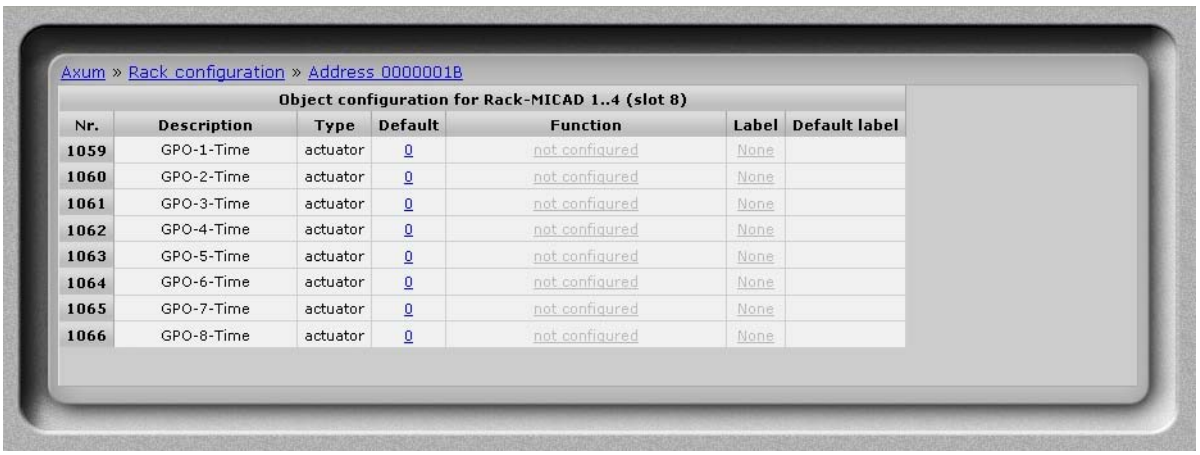
Nr.	Description	Type	Default	Function	Label	Default label
1051	GPO-1	actuator	0	DJ: Module fader and on active	None	Module active
1052	GPO-2	actuator	0	Redlight 1	None	OnAir 1
1053	GPO-3	actuator	0	Guest 1: Module fader and on active	None	Module active
1054	GPO-4	actuator	0	Redlight 1	None	OnAir 1
1055	GPO-5	actuator	0	Guest 2: Module fader and on active	None	Module active
1056	GPO-6	actuator	0	Redlight 1	None	OnAir 1
1057	GPO-7	actuator	0	Guest 3: Module fader and on active	None	Module active
1058	GPO-8	actuator	0	Redlight 1	None	OnAir 1

Figure 43: GPO configuration

- **Default**
  The gray value is the startup default, this may be changed by assigning a custom value(0 or 1). A value of '1' makes sure the GPO is active at startup. A value of '0' makes sure the GPO is inactive at startup. The GPO output state is also depending on the GPO active-state setting. When you submit an empty box the object returns to the startup default value.

- **Function**
  Here you may select which engine function is connected to the object. To use the GPO functions you should maybe change the hardware jumper setting on the board (see chapter 11.3.1 GPIO TTL/Relay selection) to enable the given engine function The default jumper setting is GPO-Relay for all cards except for the MIC input card. The default jumper setting for the MIC input card is GPIO-TTL for GPIO 1, 3, 5 and 7 and GPO-Relay for GPIO 2, 4, 6 and 8.

9.3.4 GPO Time



Nr.	Description	Type	Default	Function	Label	Default label
1059	GPO-1-Time	actuator	0	not configured	None	
1060	GPO-2-Time	actuator	0	not configured	None	
1061	GPO-3-Time	actuator	0	not configured	None	
1062	GPO-4-Time	actuator	0	not configured	None	
1063	GPO-5-Time	actuator	0	not configured	None	
1064	GPO-6-Time	actuator	0	not configured	None	
1065	GPO-7-Time	actuator	0	not configured	None	
1066	GPO-8-Time	actuator	0	not configured	None	

Figure 44: GPO Time configuration

- **Default**
  The gray value is the startup default, this may be changed by assigning a custom value.

The value must be between 0 – 250, where 0 is a continuous signal and 1 - 250 is the pulse width in milliseconds.
When you submit an empty box the object returns to the startup default value.

9.3.5 GPO Active-state

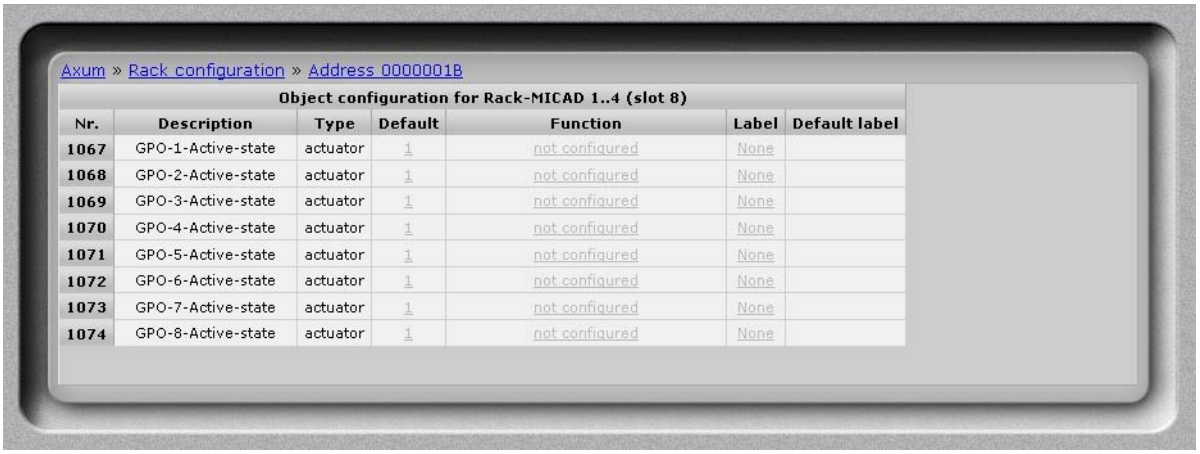


Figure 45: GPO Active-state configuration

- **Default**
  The gray value ‘1’ is the startup default, this may be changed by assigning a custom value (0 or 1). A value of ‘1’ makes sure that if the GPO is active the output is +5V in TTL mode or A/B connected for relay mode. The value ‘0’ makes sure that if the GPO is active the output is 0V in TTL mode or A/B disconnected in relay mode.
  When you submit an empty box the object returns to the startup default value.

10 Available I/O rack cards

Depending on your audio-connections, you can select the I/O cards.
The next paragraphs will give you a detailed overview on the currently available cards.

10.1 MIC input card

There are four balanced MIC inputs available on each card.
Each RJ45 connector represents a MIC input and two GPIO's which can be connected to the 19" patch panels with a shielded twisted pair (STP) cable.

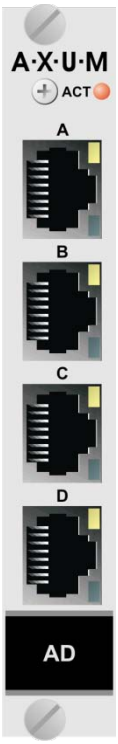
On each MIC input you can individual activate the +48V phantom power and PAD.

For each GPIO you can choose, by way of a hardware jumper on the board, between TTL Input/output or Photo-MOS relay output see chapter 11.3.1 GPIO TTL/Relay selection. For software configuration see chapter 9.3 GPIO.

Pin	Con.	Pair	Pin name	Function		Comment
1	1A	1	+Audio 1	MIC input in-phase		Imp. 2kΩ max. level +20dBu
2	1B		-Audio 1	MIC input out-phase		
3	2A	2	+Audio 2	not used		
6	2B		-Audio 2	not used		
				If jumper TTL-GPIO	If jumper GPO	see chapter 11.3.1
5	3A	3	GPIO1a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	
4	3B		GPIO1b	nGP-In (TTL)		
7	4A	4	GPIO2a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	see chapter 11.3.1
8	4B		GPIO2b	nGP-In (TTL)		
S	GND	S	Shield	GND		Audio ground and reference for GP-In

Table 10-1: MIC RJ45 connection

10.2 Line input card



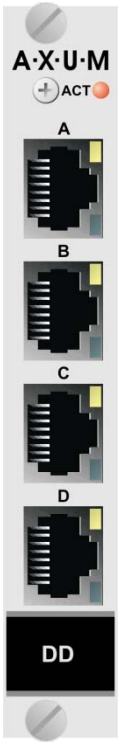
There are four balanced stereo line inputs available on each card.
Each RJ45 connector represents a stereo line input and two GPIO's which can be connected to the 19" patch panels with a shielded twisted pair (STP) cable.

For each GPIO you can choose, by way of a hardware jumper on de board, between TTL Input/output or Photo-MOS relay output see chapter 11.3.1 GPIO TTL/Relay selection. For software configuration see chapter 9.3 GPIO.

Pin	Con.	Pair	Pin name	Function		Comment
1	1A	1	+Audio 1	Left line input in-phase		Imp. 20kΩ max. level +26dBu
2	1B		-Audio 1	Left line input out-phase		
3	2A	2	+Audio 2	Right line input in-phase		Imp. 20kΩ max. level +26dBu
6	2B		-Audio 2	Right line input out-phase		
				If jumper TTL-GPIO	If jumper GPO	see chapter 11.3.1
5	3A	3	GPIO1a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	
4	3B		GPIO1b	nGP-In (TTL)		
7	4A	4	GPIO2a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	see chapter 11.3.1
8	4B		GPIO2b	nGP-In (TTL)		
S	GND	S	Shield	GND		Audio ground and reference for GP-In

Table 10-2: Line input RJ45 connection

10.3 Digital in/output card (optional SRC)



There are four balanced digital inputs and outputs available on each card.
Each RJ45 connector represents a stereo line input and two GPIO's which can be connected to the 19" patch panels with a shielded twisted pair (STP) cable.

There is also a card available with built in sample rate converters (SRC).

For each GPIO you can choose, by way of a hardware jumper on de board, between TTL Input/output or Photo-MOS relay output see chapter 11.3.1 GPIO TTL/Relay selection. For software configuration see chapter 9.3 GPIO.

Pin	Con.	Pair	Pin name	Function		Comment
1	1A	1	+Audio 1	Digital input in-phase		Imp. 110Ω/75Ω optional SRC: 32..96kHz
2	1B		-Audio 1	Digital input out-phase		
3	2A	2	+Audio 2	Digital output in-phase		Imp. 110Ω/75Ω 32, 44.1, 48kHz
6	2B		-Audio 2	Digital output out-phase		
				If jumper TTL-GPIO	If jumper GPO	see chapter 11.3.1
5	3A	3	GPIO1a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	
4	3B		GPIO1b	nGP-In (TTL)		
7	4A	4	GPIO2a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	see chapter 11.3.1
8	4B		GPIO2b	nGP-In (TTL)		
S	GND	S	Shield	GND		Audio ground and reference for GP-In

Table 10-3: Digital input/output RJ45 connection

With jumper on the I/O card it is possible to select the impedance for S/P-DIF (75Ω) or AES-3 (110 Ω)
This figures shows the jumper location on the I/O card

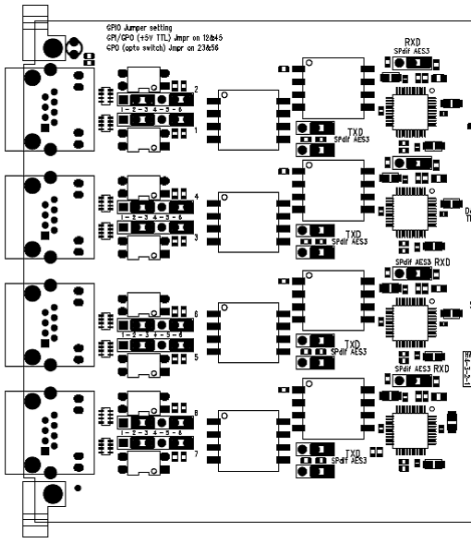
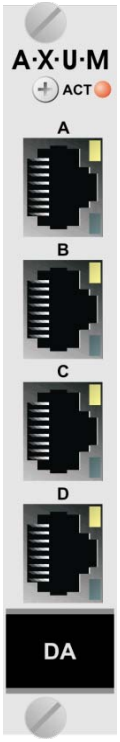


Figure 46: Digital S/P-DIF or AES3 selection

10.4 Line output card



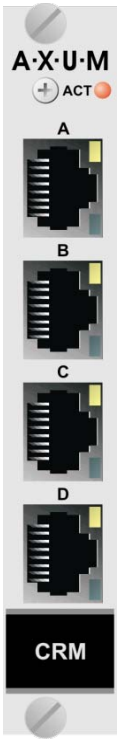
There are four balanced stereo line outputs available on each card.
Each RJ45 connector represents a stereo line output and two GPIO's which can be connected to the 19" patch panels with a shielded twisted pair (STP) cable.

For each GPIO you can choose, by way of a hardware jumper on de board, between TTL Input/output or Photo-MOS relay output see chapter 11.3.1 GPIO TTL/Relay selection. For software configuration see chapter 9.3 GPIO.

Pin	Con.	Pair	Pin name	Function		Comment
1	1A	1	+Audio 1	Left line output in-phase		Imp. 56Ω
2	1B		-Audio 1	Left line output out-phase		max. level +26dBu
3	2A	2	+Audio 2	Right line output in-phase		Imp. 56Ω
6	2B		-Audio 2	Right line output out-phase		max. level +26dBu
				If jumper TTL-GPIO	If jumper GPO	see chapter 11.3.1
5	3A	3	GPIO1a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	
4	3B		GPIO1b	nGP-In (TTL)		
7	4A	4	GPIO2a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	see chapter 11.3.1
8	4B		GPIO2b	nGP-In (TTL)		
S	GND	S	Shield	GND		Audio ground and reference for GP-In

Table 10-4: Line output RJ45 connection

10.5 CRM output card



There are four stereo outputs available on this card. RJ45 connector A&B represents the CRM stereo line output. RJ45 connector C&D represents the stereo phones outputs. Each RJ45 connector has also two GPIO's which can be connected to the 19" patch panels with a shielded twisted pair (STP) cable.

This stereo output card has some special functions:

- Analog level and mute functionality.
- Headphone amplifiers.

RJ45 A is stereo balanced output 1
RJ45 B is stereo balanced output 2
RJ45 C is stereo headphone output 3&4
RJ45 D is stereo headphone output 3&4

For each GPIO you can choose, by way of a hardware jumper on de board, between TTL Input/Output or Photo-MOS relay output see chapter 11.3.1 GPIO TTL/Relay selection. For software configuration see chapter 9.3 GPIO.

Pin	Con.	Pair	Pin name	Function		Comment
1	1A	1	+Audio 1	Left line output in-phase		Imp. 56Ω max. level +26dBu
2	1B		-Audio 1	Left line output out-phase		
3	2A	2	+Audio 2	Right line output in-phase		Imp. 56Ω max. level +26dBu
6	2B		-Audio 2	Right line output out-phase		
				If jumper TTL-GPIO	If jumper GPO	see chapter 11.3.1
5	3A	3	GPIO1a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	
4	3B		GPIO1b	nGP-In (TTL)		
7	4A	4	GPIO2a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	see chapter 11.3.1
8	4B		GPIO2b	nGP-In (TTL)		
S	GND	S	Shield	GND		Audio ground and reference for GP-In

Table 10-5: CRM output RJ45 connection (A&B)

Pin	Con.	Pair	Pin name	Function		Comment
1	1A	1	+Audio 1	Left phones 1 output		Imp. 5Ω minimal phones imp. 32Ω
2	1B		-Audio 1	Right phones 1 output		
3	2A	2	+Audio 2	Left phones 2 output		Imp. 5Ω minimal phones imp. 32Ω
6	2B		-Audio 2	Right phones 2 output		
				If jumper TTL-GPIO	If jumper GPO	see chapter 11.3.1
5	3A	3	GPIO1a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	
4	3B		GPIO1b	nGP-In (TTL)		
7	4A	4	GPIO2a	GP-Out (TTL)	Photo MOS relay (max 50V, 200mA)	see chapter 11.3.1
8	4B		GPIO2b	nGP-In (TTL)		
S	GND	S	Shield	GND		Audio ground and reference for GP-In

Table 10-6: Phones RJ45 connection (C&D)

10.6 CobraNet in/output card

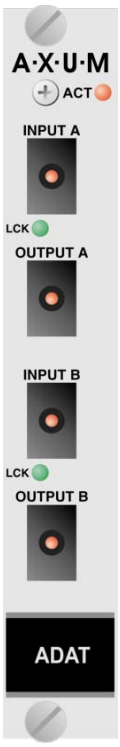
This CobraNet In/output card converts the CobraNet network signals into digital audio so it can be processed in the AXUM system's 19" inch rack.

The CobraNet In/out card can be ordered with various channel counts, please contact your sales contact for the available options.

Pin	Con.	Pair	Pin name	Function	Comment
1	1A	1	TX +	Ethernet	Ethernet TX 10/100BASE-T
2	1B		TX -	Ethernet	
3	2A	2	RX+	Ethernet	Ethernet RX 10/100BASE-T
6	2B		RX-	Ethernet	
5	3A	3	NC		
4	3B		NC		
7	4A	4	NC		
8	4B		NC		
S	GND	S	Shield	GND	Ground

Table 10-7: CobraNet RJ45 (Ethernet) connection.

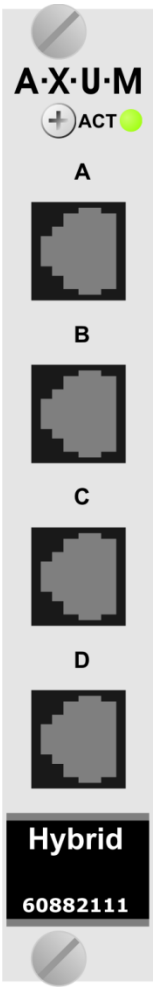
10.7 ADAT in/output card



This ADAT In/output card converts the ADAT optical signals into digital audio which can be received by the 19” inch rack.

The ADAT card has to run synchronous with the connected devices, allowed sample rate frequencies are 32kHz, 44.1kHz or 48kHz.

10.8 Hybrid in/output card



Pin connection Hybrid card.					
Pin RJ14	Pin RJ11	Pin name	Pair	Function	Comment
1		R2 +	2	To Handset R +	
2	1	R1 -	1	From Wall R-	
3	2	T1 +		From Wall T+	
4		T2 -	2	To Handset T -	

Table 10-8 Hybrid Rj14 (Telephone) connection

This Hybrid In/output card converts the analog telephone signals into digital audio so it can be processed by the 19" inch rack.

The Hybrid card allows external callers to be connected to the AXUM. A connection can be established via the start/stop function in the engine.

If a local phone is connected, it is possible to originate a call to a remote side. If no local phone is present, someone at a remote site must call you.

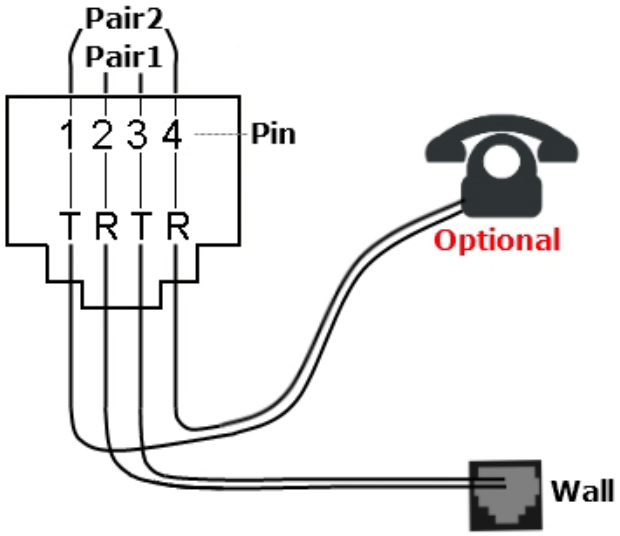
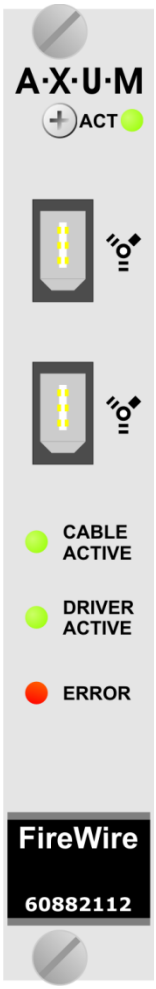


Figure 47: Example of a single Hybrid connection

10.9 Firewire in/output card



This Firewire In/output card converts the Firewire digital signals into digital audio which can be processed by the 19” inch rack.

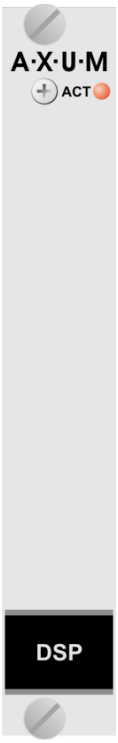
The Firewire card has to run synchronous with the connected devices, allowed sample rate frequencies are 32kHz, 44.1kHz or 48kHz.

WDM and ASIO Drivers are available.

Via WDM driver the device is seen as a single multi-channel WDM device (8 channels). Normally this means your card acts like a 7.1 surround card, unless your software is capable of using the 8 channels separate.

Via ASIO driver all 16 channels are available.

10.10DSP card



The DSP card adds mixing capabilities to your 19” rack. In combination with the Axum engine, this card gives you 32 stereo processing channels to create a mixing desk. The system may be loaded with four DSP cards, which generates a mixing console with 128 stereo channels.

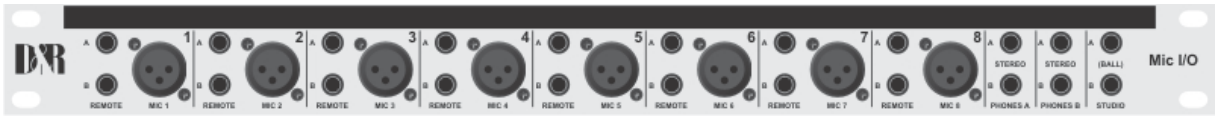
The ACT(ive) LED blinks when this card functions properly.

11 Patch panels

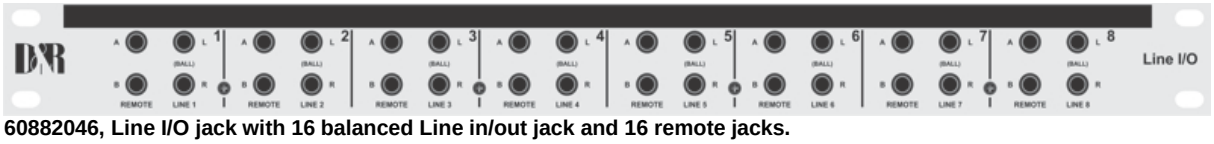
All distribution of audio within the AXUM digital audio system is with shielded twisted pair cable.
The Breakout 19” panels, you need to connect equipment use standard audio connectors.

11.119” Patch panels / Breakout panels

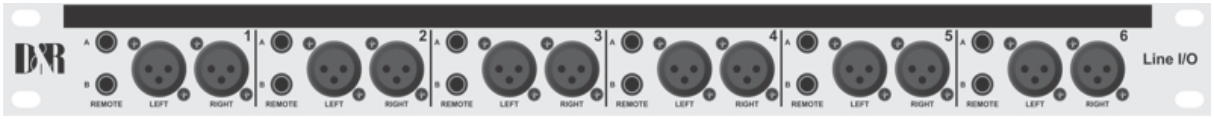
The AXUM 19” Break out patch panels convert the RJ45 Shielded connection to the industry standard connectors such as XLR and Jack. There are various patch panels available for the AXUM for example:



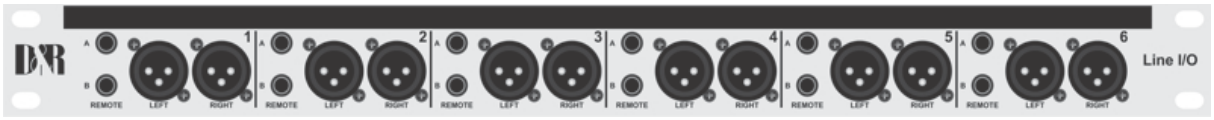
60882045, The MIC I/O with 8 MIC XLR, 16 remote jacks, 4 stereo phone jacks, 2 Line out jacks.



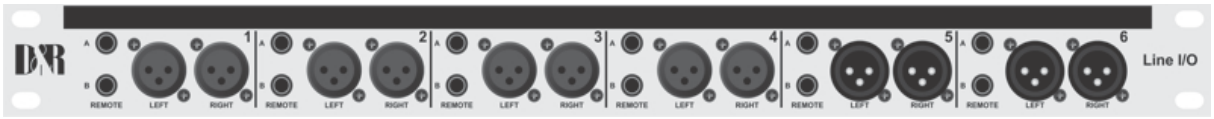
60882046, Line I/O jack with 16 balanced Line in/out jack and 16 remote jacks.



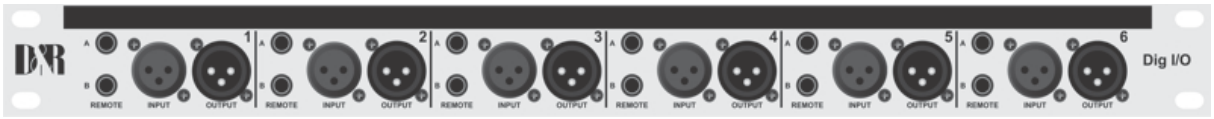
60882047, Line input XLR with 12 balanced Line in XLRs (female) and 12 remote jacks.



60882048, Line output XLR with 12 balanced Line out XLRs (male) and 12 remote jacks.



60882049, Line I/O XLR with 8 balanced Line in XLRs (female), 4 balanced Line out XLRs (male) and 12 remote jacks.



60882050, Dig I/O with 6 stereo digital inputs and 6 stereo digital outputs.

Figure 48: AXUM Break out Panels

11.2 Wiring

11.2.1 GPIO/Remote

The remote jack connects to all kinds of remote in-/outputs. Such as remote start/stop, external red lights or cough. The function of the remote jack depends on the I/O card and function setup for this GPIO. The software determines its function and where it is connected to.

! NEVER CONNECT HIGH POWER VOLTAGE (WALL POWER) TO THE REMOTE-JACK !

If the GPIO jumper setting on the Axum-Rack-Board is set for GPO the remote becomes only a Remote-Output by a build in Solid State Relay. The relay is situated between Tip and Ring of the remote jack.
Normally the GPIO jumper setting on the Axum-Rack-boards are set for GPO.

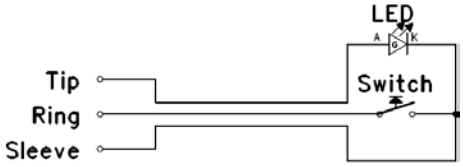
Jack	Name	function	Comment
	Tip	GP-CC	GPIO Jumper 23 & 56: Photo MOS relay (max 50V, 200mA)
	Ring	GP-NO	
	Sleeve	Shield	Ground

Table : GPO Patch Panel wiring

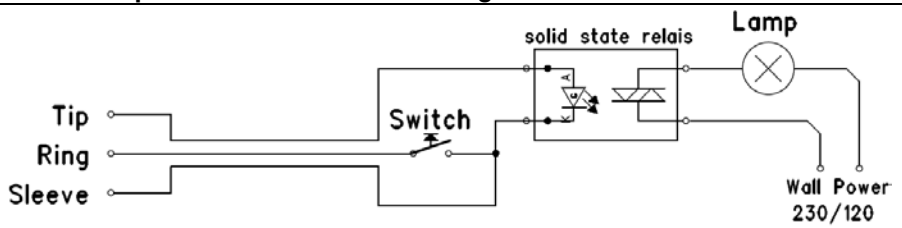
If the GPIO jumper setting on the Axum-rack-Board is set for GPIO the remote becomes a Remote-Output GPO (+5V TTL) on the Tip of the remote jack and a Remote-Input GPI (+5V TTL internal pull-up) on the Ring. The Sleeve is Shield and the ground for the TTL signal.

Jack	Name	function	Comment
	Tip	GP-Output	GPIO Jumper 12 & 45: GPO: +5V, 560R Ohm GPI: max. +5V with 10k internal pull-up.
	Ring	GP-Input	
	Sleeve	Shield	Ground

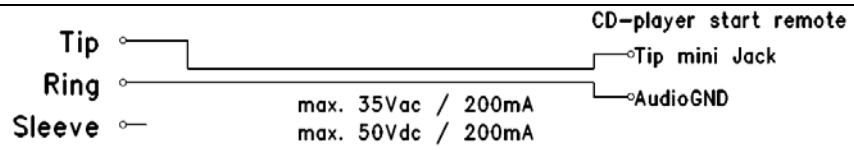
Table : GPIO Patch Panel wiring



GPIO connection example for MicOn-LED and cough-switch remote.



GPIO connection example for OnAir-Lamp and TB-Switch remote.



GPO connection example for remote START Pioneer CD-player.

11.2.2 MIC

The MIC input connects microphones to the AXUM. The AXUM Mic Rack Module supports 48 volts DC phantom power if it is switched on in the software.

Female XLR	Pin	Function	Comment
	2	+Audio	Audio in phase
	3	–Audio	Audio out phase
	1	Shield	Ground

Table 11-1: MIC patch panel XLR wiring

11.2.3 Phones

The Phones jacks connect headphones to the AXUM console. The PHONES-A and PHONES-B female jack outputs all carry a stereo headphones signal. The phones connection connects to the CRM-DA module.

Jack	Name	Function
	Tip	Audio left
	Ring	Audio right
	Sleeve	Shield

Table 11-2: Phones patch panel jack wiring

11.2.4 Stereo line input and output

The line I/O jack patch panel houses female jack connecters, the line I/O XLR patch panel houses XLR type connectors (male or female).

Female XLR	Male XLR	Name	Function	Pinning
		2	+Audio	Audio in phase
		3	-Audio	Audio out phase
		1	Shield	Ground

Table 11-3: Line I/O patch panel XLR wiring

11.3 Standard RJ45 wiring

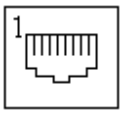


Figure 49: RJ45 Connector

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Shield
RJ45 name	1A	1B	2A	3B	3A	2B	4A	4B	S
Ball	Left (Hot)	Left (Cold)	Right (Hot)	GPIO1	GPIO1	Right (Cold)	GPIO2	GPIO2	Shield
Phones	Left 1	Right 1	Left 2			Right 2			

Table 11-4: Standard RJ45 wiring

11.3.1 GPIO TTL/Relay selection

Each RJ45 connection on I/O cards handles audio signals and GPIOs.
The GPIO pins can be configured to work as:

- TTL in and out
  this is selected by GPIO1 jumpers in the place 12 and GPIO2 jumpers in place 45. These jumpers are located on the I/O cards, close to the RJ45 connectors.

Pin	Con.	Pair	Pin name	Function	Comment
1	1A	1	+Audio 1	Left audio input or output in-phase	Imp. 2k Ohm
2	1B		-Audio 1	Left audio input or output out-phase	max. level +20dBu
3	2A	2	+Audio 2	Right audio input or output in-phase	Imp. 2k Ohm
6	2B		-Audio 2	Right audio input or output out-phase	max. level +20dBu
5	3A	3	GPIO1a	GP-Out	+5V TTL out, 560R
4	3B		GPIO1b	GP-In	+5V TTL in, 10kR int. pull-up
7	4A	4	GPIO2a	GP-Out	+5V TTL out, 560R
8	4B		GPIO2b	GP-In.	+5V TTL in, 10kR int. pull-up
S	GND	S	Shield	GND	Audio ground and reference for GP-In

Table 11-5: RJ45 pinning in GPIO-TLL mode

- Relay out (no input available).
  this is selected by GPIO1 jumpers in the place 23 and GPIO2 jumpers in place 56. These jumpers are located on the I/O cards, close to the RJ45 connectors.

Pin	Con.	Pair	Pin name	Function	Comment
1	1A	1	+Audio 1	Left audio input or output in-phase	specifications depends on I/O card
2	1B		-Audio 1	Left audio input or output out-phase	
3	2A	2	+Audio 2	Right audio input or output in-phase	specifications depends on I/O card
6	2B		-Audio 2	Right audio input or output out-phase	
5	3A	3	GPIO1a	Relay, connecting a&b	Photo MOS relay Bidirectional Max. 50V, 200mA
4	3B		GPIO1b		
7	4A	4	GPIO2a	Relay, connecting a&b	Photo MOS relay Bidirectional Max. 50V, 200mA
8	4B		GPIO2b		
S	GND	S	Shield	GND	Audio ground and reference for GP-In

Table 11-6: RJ45 pinning in GPO-Relay mode

The figure shows how the jumper selection on the I/O card looks:

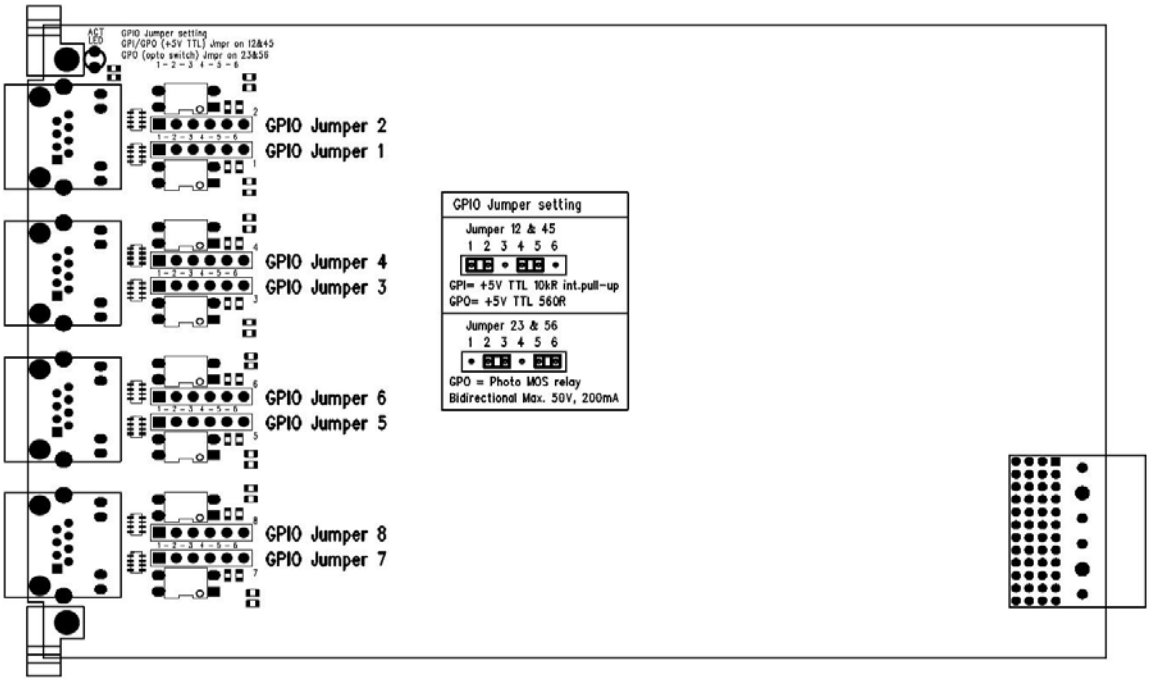


Figure 50: GPIO TTL/Relay jumper selection

12 Specifications AXUM digital audio system

12.1 Input/output cards

Mic inputs : Electronically balanced
: Input impedance 2k Ohm
: Input sensitivity -70dBu up to +20dBu (PAD)
: CMRR MIC inputs: 85dB @ 1kHz, maximum gain
: Phantom is switchable +48 Volts
: Optional is transformer balancing

Line inputs : Electronically balanced
: Input impedance 10k Ohm
: input sensitivity +6dBu, maximum input +26dBu (+/- 20dB gain range).
: CMRR Line inputs: 30dB @ 1 kHz, maximum gain
: Transformer balancing is optional on the patch panels

Line Outputs : Electronically balanced
: Output impedance 56R Ohm.
: Nominal output level +6dBu, maximum output +26dBu
: Optional is transformer balancing

Digital Inputs : AES/EBU (AES3) or S/P-DIF
: 16/20/24 bit, 32kHz to 96kHz (optional built in sample rate converter)
: Input Impedance: 110R Ohm/75R Ohm

Digital outputs: AES/EBU (AES3) or S/P-DIF.
: 16/20/24 bit, 32kHz to 48kHz
: Output level: 2 to 5 volt
: Output Impedance: 110R Ohm/75R Ohm

GPIOs : All GPO's are by opto isolated relays able to handle a maximum of 50V at 200mA
: All GPI's have a 5V TTL 100kOhm circuitry
: GPIO-MIC has a 5V/600Ohm LED driver circuit

12.2 DSP processing

6 Bands EQ : +/- 18 dB, 20 – 20000 Hz, 0.1Q – 10Q LPF, LShelf, Peaking, HSelf, HPF, BPF, Notch

Dynamics : Mentioned for voice processing use, you can setup the downward expander threshold
: AGC threshold and ratio of working of the AGC.

12.3 OVERALL

Level : 0dBu = 0.775Vrms
: 0dB internal = -20 dBFs.

Clock : Sample rate: 32 kHz, 44.1 kHz, 48 kHz, +/- 20ppm (internally synchronized)

Frequency response : 20 - 20.000 Hz +/- 0.2dB
THD+N : <-96dBfs
Dynamic Range : typically 105dB
Crosstalk : less than -90dBr
Noise : -86dBr

Power supply : Neutrik™ PowerCon™ (delivered in the package).
: 100-240 Volt, 50/60Hz (1.7A Max)

12.4 DIMENSIONS

ADD NEW 4FBP AND CRMP FRAMES

FRAME-10
Outside : 492 x 410 x 60/90mm
Drop through : 486 x 430mm
Weight : 10kg

FRAME-14
Outside : 684 x 410 x 60/90mm
Drop through : 678 x 430mm
Weight : 15kg

FRAME-18
Outside : 876 x 410 x 60/90mm
Drop through : 870 x 430mm
Weight : 20kg

FRAME-22
Outside : 1062 x 410 x 60/90mm
Drop through : 1056 x 430mm
Weight : 25kg

FRAME-26
Outside : 1260 x 410 x 60/90mm
Drop through : 1254 x 430mm
Weight : 30kg

RACK-ONE
Outside : 483 x 133 x 260mm

RACK-TWO
Outside : 483 x 266 x 260mm

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15 Declaration Of Conformity

DECLARATION OF CONFORMITY

Manufacturers Name: **D&R Electronica Weesp B.V.**

Manufacturers Address: **Rijnkade 15B**
1382 GS Weesp
The Netherlands

Declares that the product

AXUM digital audio system

conforms to the following product specifications:

EMC:	NEN-EN 55103-1	**1995**
	NEN-EN 55103-2	**1995**
	NEN-EN 55013-1	**1994**

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC (1989) as amended by the CE Marking Directive 93/68/EEC (1993).

D&R Electronica Weesp B.V.
Rijnkade 15 B
1382 GS WEESP
The Netherlands
President of Engineering

16 Product Safety

This product is been manufactured with the highest standards and is double-checked in our quality control department for reliability in the "HIGH VOLTAGE" section.

CAUTION

- **Never remove any panels, or open this equipment.**
- **No user serviceable parts inside.**
- **Equipment power supply must be grounded at all times.**
- **Only use this product as described, in user manual or brochure.**
- **Do not operate this equipment in high humidity or expose it to water or other liquids.**
- **Check the AC power supply cable to assure secure contact.**
- **Have your equipment checked yearly by a qualified dealer service center.**
- **Hazardous electrical shock can be avoided by carefully following the above rules.**

PLEASE READ THE FOLLOWING INFORMATION VERY CAREFULLY

Voltage and current cause an electrical shock. In practice the higher the voltage the higher the current will be and the higher the shock. However, there is another thing to consider and that is resistance. When the resistance in Ohms is high between two poles, the current will be low and visa versa. All three of these; voltage, current and resistance are important in determining the effect of an electrical shock.

The severity of a shock is caused by the amount of current flowing through a person.

A person can feel a shock because the muscles in a body respond to electric current. Current can also be fatal when it causes the chest muscles to contract and stop breathing.

At what potential is current dangerous? Well the first feeling of current is a tingle at 0.001 Amp of current. The current between 0.1 Amp and 0.2 Amp is fatal.

Imagine that your home fuses of 16 Amp can handle 200 times more current than is necessary to kill. How does resistance affect the shock a person feels? A typical resistance between your two hands "dry" condition could be well over 100,000 Ohm. But if your body is transpiring extensively your body resistance is lowered by more than 50%. This is a situation in which current can easily flow.

Always earth all your equipment by the grounding pin in your main plug. Proper wiring and isolation input/output transformers should only cure hum loops.

Always replace fuses with the same type and rating after the equipment has been turned off and unplugged. If the fuse blows again you have an equipment failure. Do not use it again and return it to your dealer for repair.

And last but not least be careful not to touch a person being shocked as you, yourself could also be shocked. Once removed from the shock, have someone send for medical help immediately!

Always keep the above-mentioned information in mind when using electrically powered equipment.

17 Disclaimer

Due to a policy of continuous product improvement, D&R Electronica Weesp B.V. reserves the right to change specifications, appearance and performance without prior notice.

Since the use of this information and the conditions by which the products are used are beyond the control of D&R Electronica Weesp B.V., it is the obligation of the owner and/or the equipment operator to determine the correct and safe selection, settings and conditions of use of the equipment and products.

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18 Appendix A - Network design for AXUM

The platform AXUM design is according to the OSI-Model and makes use of protocols on different levels. It is important to understand the philosophy on the different levels in networking and the way the AXUM implemented this.

With this knowledge, you can make an advanced network setup within your studio(s) give you possibilities for:

- Remote configuration
- Remote service
- Connecting multiple AXUM racks to internet.
- Secure working within office-networks.

18.1 Network levels

Most of the people are aware of IP addresses. IP stands for 'Internet Protocol' and is in the OSI-Model called a 'level 3' protocol. In smaller office-networks, you normally only have to care about this 'level 3' (so IP).

The LAN connections (Local Area Network) normally use the Ethernet technology. Where the Ethernet is called a 'level 2' protocol.

For your understanding 'level 1' is the physical cable like CAT5e (often called RJ45-cable or Ethernet-cable).

An example how these 'levels' are used in an office network is your connection to the Internet:
- Your LAN connections are Ethernet
- Your WAN connection is DSL or GPRS/HDSPA
The fact is that the 'level 3' IP can be send on LAN and WAN, but the 'level 2' Ethernet is only available in the local area.

18.2 AXUM Network implementation

The AXUM system communication, where you have to think of fader, knob data etc. is based on the protocol MambaNet. MambaNet may run over other protocols and this can be L2 and L3 protocols.

Two examples of a valid AXUM solution:

18.2.1 MambaNet example 1

- MambaNet over layer 2 (Ethernet)
  Is used for the Axum internal communication, where you have to think of fader, knob data etc. etc.
- Configuration over layer 3 (IP)
  Is used for the Axum configuration and service access.

This makes sense because then the AXUM internal communication is independent of any IP address assignment and will always work independent on the IP-configuration. Second, the configuration is based on IP so with a good network design you can access configuration and service functionality over Internet.

Because layer 2 is a package switched solution this gives the restriction you can only use one AXUM rack in the Ethernet network. The next example can be used in a multi-rack network setup.

18.2.2 MambaNet example 2

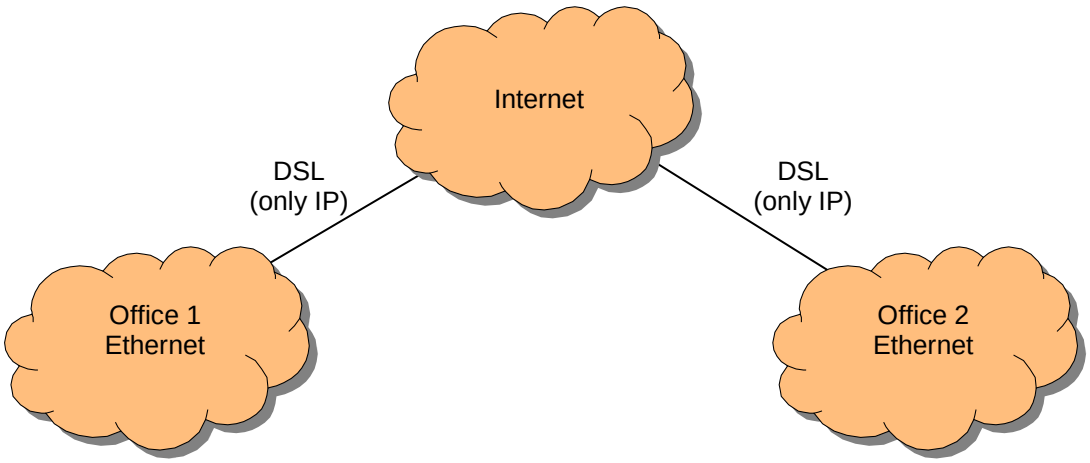
- MambaNet over layer 3(UDP or TCP)
  Is used for the Axum internal communication, where you have to think of fader, knob data etc. etc.
- Configuration over layer 3 (IP)
  Is used for the Axum configuration and service access.

The MambaNet over UDP (and TCP) is connection oriented. With the destination IP address you determine to which rack this surface hooks up.

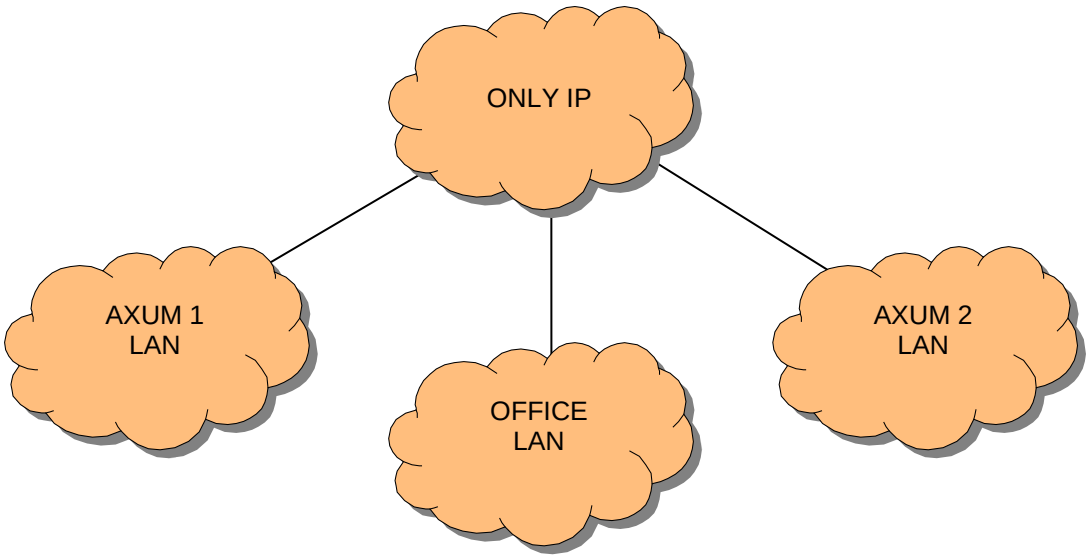
18.3 Network design (MambaNet over Layer 2)

An AXUM system require to have an own LAN (layer 2) to work without risk of interference with office networks and or other AXUM systems. The most basic way of describing this is:
“Each Axum system requires its own Ethernet switch”.

As you can understand this means there is no connection (so communication possible) between the separate LANs. This creates the problem you cannot access the console(s) from a single internet connection or from your office network. To overcome this problem you have to design the network with a separation on ‘level 2’ (Ethernet) but a connection over ‘level 3’ (IP) must be possible.
Most simple example on such separation is:



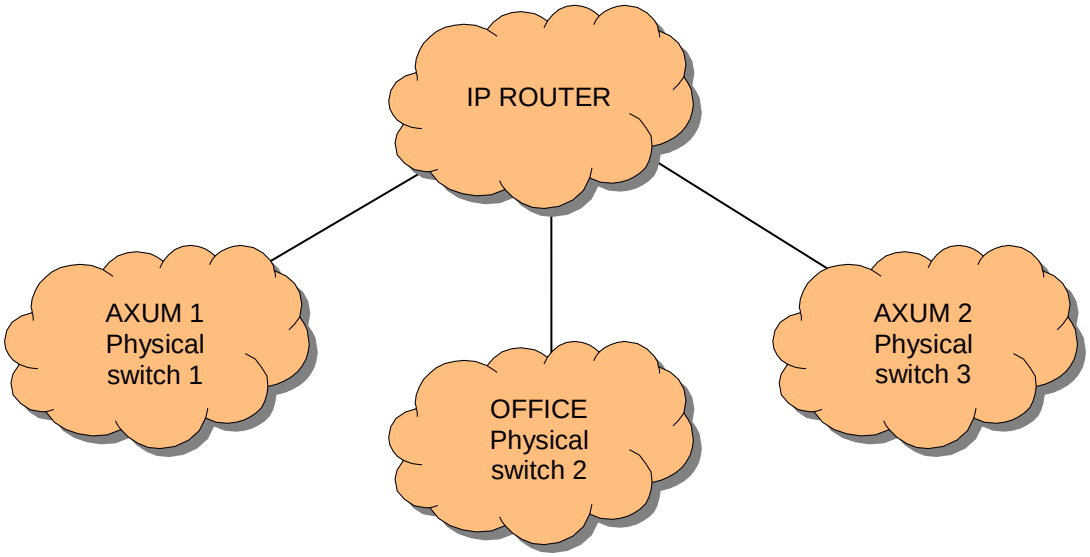
Here you see two LAN networks, both connected to internet. With correct IP-addressing Office 1 and 2 can reach each other using the IP protocol. However, there will be no interference between Office 1 and 2 on Ethernet. In fact, you have to create the same network level-structure in your studio for correct function.



In the next chapters we show you some solutions how to implement this structure. Because these structures are well known in network-technologies there are also several different solutions where you can pick the most interesting/efficient for you.

18.3.1 Practical solution 1: Physical separated switches and IP router

If you give the AXUMs and OFFICE networks their own physical Ethernet switch, you ofcourse have good ‘level 2’ (Ethernet) separation. If you additional hook up an IP router to the Ethernet switches it is possible to make IP routes between the different networks, without ‘level 2’ interference.



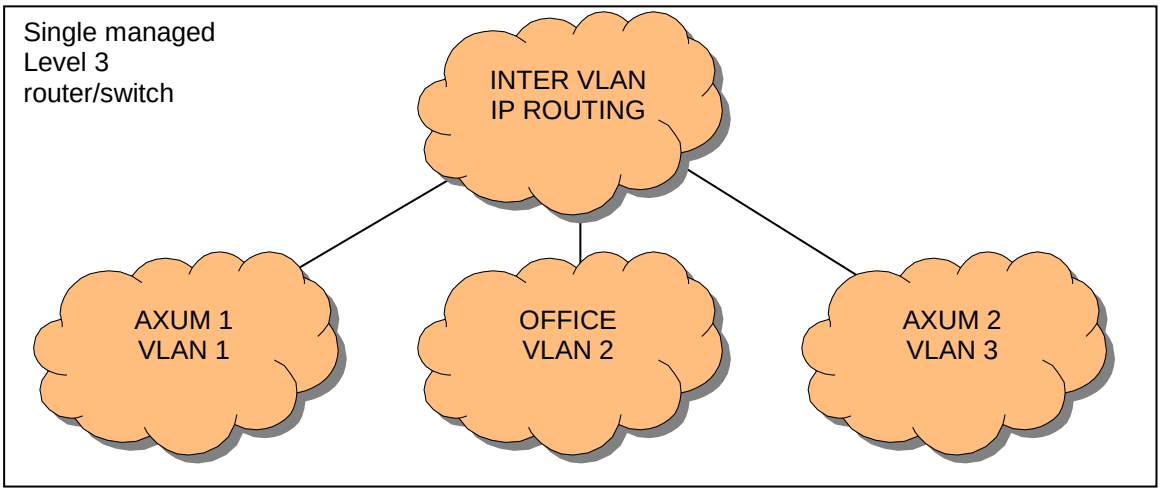
18.3.2 Practical solution 2: single managed level 3 switch/router

When you select an level 3 managed switch with the following features:

- Port VLAN
- Inter VLAN routing (IP)

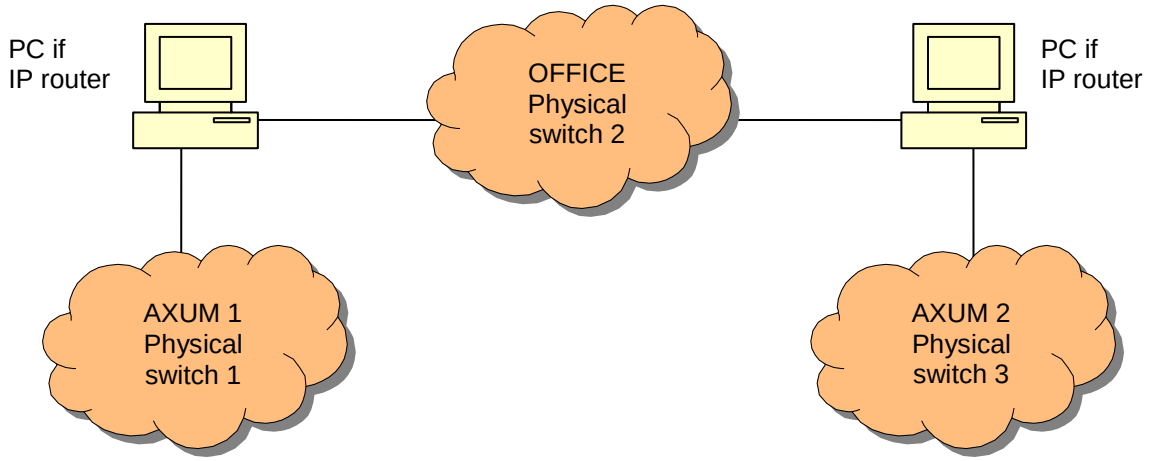
(VLAN stands for Virtual Local Area Network)

It will be possible to hook up all your network equipment to the same switch and configure the switch so it functions equal to 'Practical solution 1'. Therefore you have to make 3 VLANs and make correct Inter VLAN IP routes.



18.3.3 Practical solution 3: Physical separated switches and PCs if IP router

It is also possible to have a PC configured to do IP routing. Of course, it is necessary to have two or more network cards before you can make IP routing. In our example we will show an setup with two PCs with two network card. *(As you can imagine it will also be possible with one PC using three network cards)*



On a PC you can give the command: `ipconfig /all`

This will show if your PC is configured as a router:

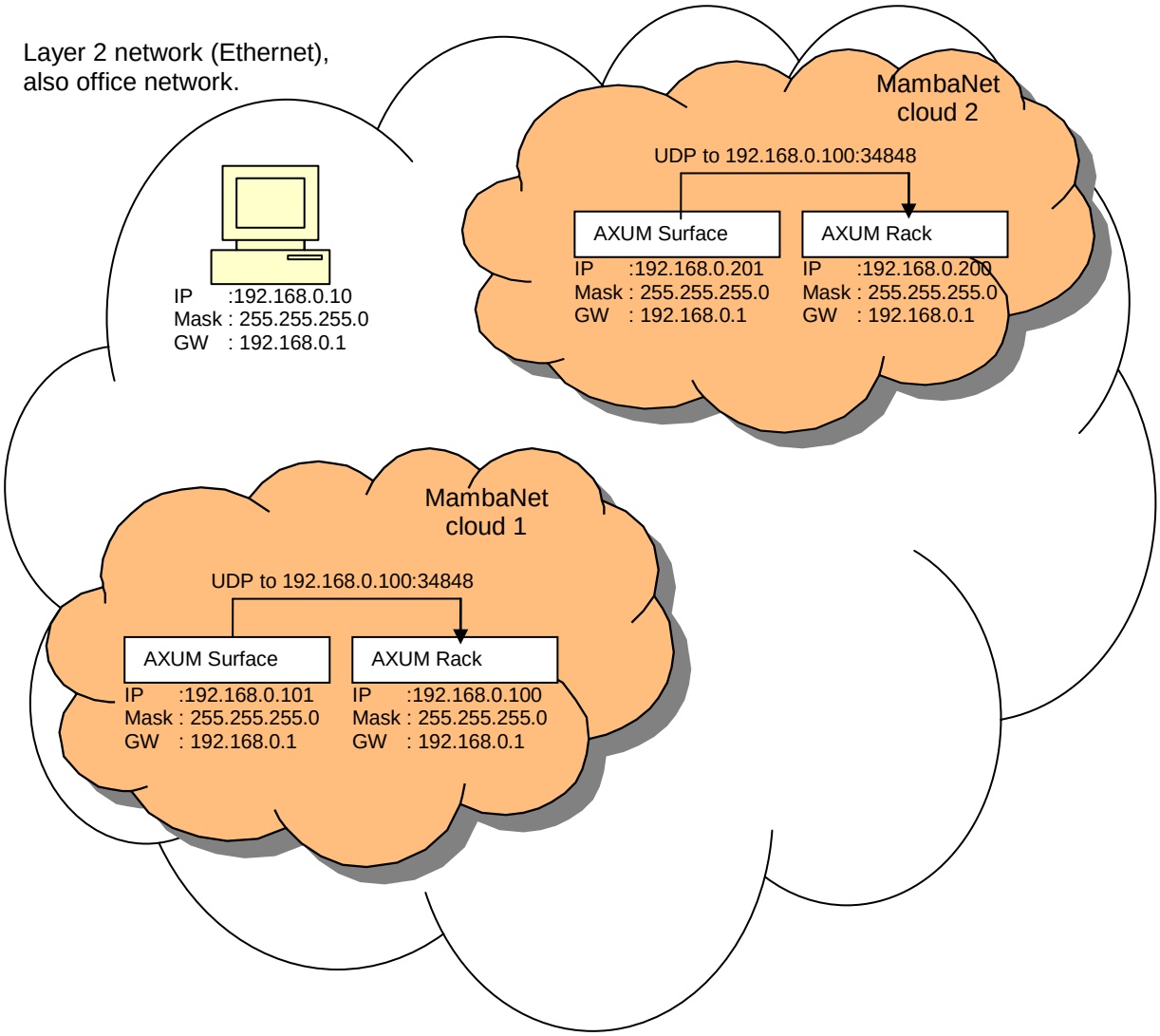
```
C:\Documents and Settings\Anton.dnr>ipconfig /all

Windows IP Configuration

        Host Name . . . . . . . . . . . . : RND3
        Primary Dns Suffix  . . . . . . . : dnr.local
        Node Type . . . . . . . . . . . . : Hybrid
        IP Routing Enabled. . . . . . . . : Yes
        WINS Proxy Enabled. . . . . . . . : No
        DNS Suffix Search List. . . . . . : dnr.local
                                            dnr.local
```

If not you have to use regedit to change a parameter to '1' in the registry (this requires a reboot).

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\IPEnableRouter

18.4 Network design (MambaNet over Layer 3)

When using MambaNet over UDP or TCP it is possible to use multiple racks in a single network.
It is important you realize that a single surface may connect to a single rack only.



MambaNet over UDP or TCP also gives possibilities to connect to AXUM Racks over the internet; this requires port forwarding in the router between internet and your local network.

18.5 IP subnets and IP routes

When you have made your network design, where the level 2 is separated and you IP routing is available you need to care about correct IP addressing, subnets and routes. Altough your internal AXUM configuration will function without problem. These IP addressing are necessary for:

- Configuration
- NTP time synchronization
- Remote access.

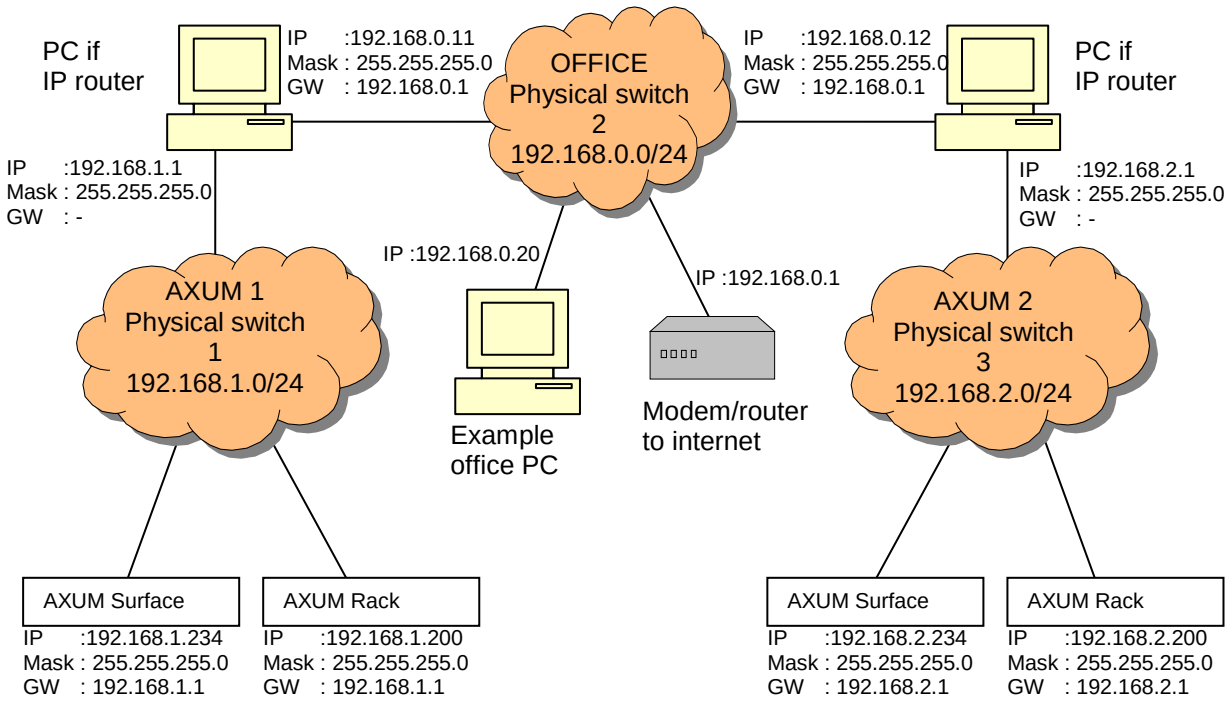
First you have to define a different subnet for each separated 'level 2' network. Lets say:

Network	Axum 1	Axum 2	Office
network-address	192.168.1.0/24	192.168.2.0/24	192.168.0.0/24

Where 192.168.1.0/24 also may be written as:

IP Address : 192.168.1.x
Subnetmask : 255.255.255.0
Gateway : 192.168.1.y
DNS : <IP internet DNS Server> or <IP of modem/router>

For your information we have added IP information to practical solution 3:



When you no want to reach AXUM 1 and AXUM 2 from the Example office PC it is required make static routes. This because:

- all network addresses 192.168.1.0/24 need to be send via 192.168.0.11
- all network addresses 192.168.2.0/24 need to be send via 192.168.0.12

in the windows command line you can add permanent routes:

```
route -p ADD 192.168.1.0 MASK 255.255.255.0 192.168.0.11
route -p ADD 192.168.2.0 MASK 255.255.255.0 192.168.0.12
```

The same static routes are required if you want that the modem/router can access those subnets. You want the modem to access the subnets in case of remote access from internet. See the modem/router manual how to make static routes.

18.6 Remote access

Now you have setup your network and IP addressing correct you have to do one last step before you can remote access your AXUM systems. There are also different methods for remote access, for all methods you have to check the manual of your modem/router how to setup.

1) VPN connection
   Virtual Private Network is a secure way to have remote access and you can use the internal IP numbers at your remote location.

2) Port redirection (found under NAT = Network Address Translation)
   In most modems/routers you can redirect ports where you can choose the 'Public port' which is accessed from internet and tell which internal IP and port it must be redirected to.

   For example HTTP is normally running on port 80, and this web server is running in your local network (IP 192.168.0.99). You also can access this webserver from remote if you make a port redirects like:
   Public port: 9080 is redirected to Private IP: 192.168.0.99, Private port: 80
   Public port: 9081 is redirected to Private IP: 192.168.0.100, Private port: 80

   If you are on a remote location start your webbrowser and type: <WAN-IP>:9080 you will see the internal webbrowser 1 and with <WAN-IP>:9081 you will see internal webbrowser 2.

   A port redirect is less secure than VPN.

3) Open ports (found under NAT = Network Address Translation).
   An open port you may give a internal private IP address, the disadvantage of an open port is you never can reach two IP-addresses on the same port number. So one port 80 open to webserver 1 you cannot reach webserver 2 with an open port.

   An open port is less secure than port redirect, this because well known protocols are on their own well known port numbers.

If D&R ask for remote assistance it is required you make a redirect to internal Private IP 22 of the AXUM rack. If we want to have remote access via port redirects in the IP subnet and IP route example as seen before we have to make the following configuration in the modem/router:

Static routes:
192.168.1.0/24 to 192.168.0.11
192.168.2.0/24 to 192.168.0.12

Port redirects:
Public port 9001 to Private IP: 192.168.1.200, Private Port: 22
Public port 9002 to Private IP: 192.168.2.200, Private Port: 22

19 Appendix B – Surface service

If you browse to the url http://192.168.0.234/service (where 192.168.0.234 should be your local console IP address) you have a service menu with give some management possibilities.

Figure 51: Console service menu

- **Package versions**
  Shows the packages, version and build/install date.

- **Download backup**
  Downloads a file which is a complete image of the internal flash disk.

- **Change password**
  Here you can change the password for the webserver

- **Upload logo**
  Here you can upload your own logo which will appear on the meter screen.

19.1 Package versions

This page shows the installed packages with their version number, build and install date.

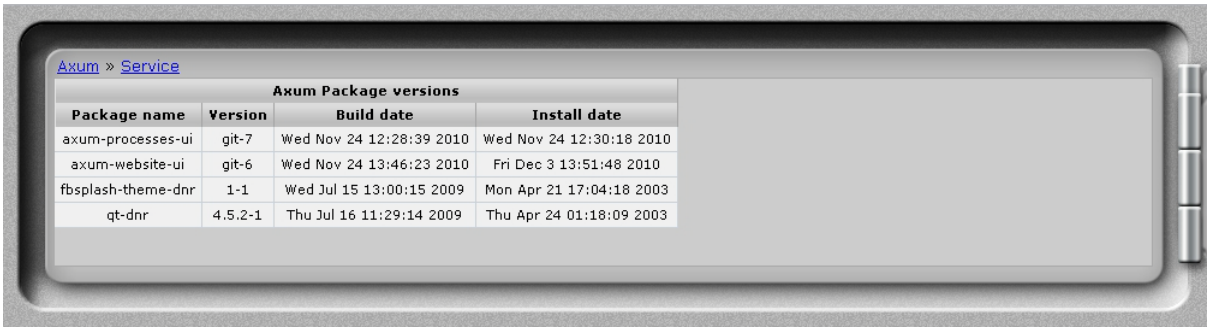


Figure 52: Package versions

19.2 Change password

The webserver requires authentication. On this page you change the username and password.

Figure 53: Change password

19.3 Upload logo

On this page you can upload you own logo which will appear on the meter screen.

Figure 54: Logo upload

- **Logo upload**
  Choose the logo you want to use and upload it to the website. The logo must be a .png image. It will be resized to 256x150 pixels.
  After a reboot the logo will be visible on the meter screen from the AXUM console.

20 Appendix C – Engine functions

The engine houses all mixing console functions and is able to connect various objects to its function as has been described in the previous chapters. Below we give a list of all available functions within the engine.

20.1 Modules

If four DSP cards are inserted, it is possible to have 128 modules (32 stereo modules per DSP card). For each module, you are able to connect objects to the following functions:

Function name	comments	Example object to connect to	Version
Label	Label of the module	Display	2.0
Source	Steps through the source list at the current module	Encoder, Display	2.0
Module preset A	Select the pre configured module preset 1A, 2A, 3A or 4A. (Which of the 4 depends on the last console preset used).	Switch	2.2
Module preset B	Select the pre configured module preset 1B, 2B, 3B or 4B. (Which of the 4 depends on the last console preset used).	Switch	2.2
Module preset A/B	Toggle the pre configured module preset 1A/1B, 2A/2B, 3A/3B or 4A/4B. (Which of the 4 depends on the last console preset used).	Switch	2.2
Module preset 1A	Select the pre configured Module preset 1A	Switch	2.1
Module preset 1B	Select the pre configured Module preset 1B	Switch	2.1
Module preset 2A	Select the pre configured Module preset 2A	Switch	2.1
Module preset 2B	Select the pre configured Module preset 2B	Switch	2.1
Module preset 3A	Select the pre configured Module preset 3A	Switch	2.1
Module preset 3B	Select the pre configured Module preset 3B	Switch	2.1
Module preset 4A	Select the pre configured Module preset 4A	Switch	2.1
Module preset 4B	Select the pre configured Module preset 4B	Switch	2.1
Source phantom	Toggles phantom power on the source routed to this module	Switch	2.0
Source pad	Toggles PAD on the source routed to this module	Switch	2.0
Source gain level	changes (analog) gain on the source routed to this module	Encoder	2.0
Source gain level reset	changes (analog) gain on the source routed to this module	Switch	2.0
Insert on/off	Switches the insert return on/off	Switch	2.0
Phase	Change phase of all channels in the module	Switch	2.0
Phase on/off	Switches the phase on/off	Switch	2.1
Gain level	Controls the gain in steps of 0.1 dB	Encoder, Display	2.0
Gain level reset	Sets the gain to 0 dB	Encoder switch	2.0
Low cut frequency	Low cut frequency control.	Encoder, Display	2.0
Low cut on/off	Select the low cut on/off	Switch	2.0
EQ Band 1 Level	Controls the EQ level in steps of 0.1 dB	Encoder	2.0
EQ Band 1 Frequency	Controls the EQ frequency	Encoder	2.0
EQ Band 1 Bandwidth	Controls the EQ bandwidth	Encoder	2.0
EQ Band 1 Level reset	Sets the EQ level to the band default	Encoder Switch	2.0
EQ Band 1 Frequency reset	Sets the EQ frequency to the band default	Encoder Switch	2.0
EQ Band 1 Bandwidth reset	Sets the EQ bandwidth to the band default	Encoder Switch	2.0
EQ Band 1 Type	Steps through the EQ band types available	Encoder	2.0
EQ Band 2 Level	Controls the EQ level in steps of 0.1 dB	Encoder	2.0
EQ Band 2 Frequency	Controls the EQ frequency	Encoder	2.0
EQ Band 2 Bandwidth	Controls the EQ bandwidth	Encoder	2.0
EQ Band 2 Level reset	Sets the EQ level to the band default	Encoder Switch	2.0
EQ Band 2 Frequency reset	Sets the EQ frequency to the band default	Encoder Switch	2.0

Function name	comments	Example object to connect to	Version
EQ Band 2 Bandwidth reset	Sets the EQ bandwidth to the band default	Encoder Switch	2.0
EQ Band 2 Type	Steps through the EQ band types available	Encoder	2.0
EQ Band 3 Level	Controls the EQ level in steps of 0.1 dB	Encoder	2.0
EQ Band 3 Frequency	Controls the EQ frequency	Encoder	2.0
EQ Band 3 Bandwidth	Controls the EQ bandwidth	Encoder	2.0
EQ Band 3 Level reset	Sets the EQ level to the band default	Encoder Switch	2.0
EQ Band 3 Frequency reset	Sets the EQ frequency to the band default	Encoder Switch	2.0
EQ Band 3 Bandwidth reset	Sets the EQ bandwidth to the band default	Encoder Switch	2.0
EQ Band 3 Type	Steps through the EQ band types available	Encoder	2.0
EQ Band 4 Level	Controls the EQ level in steps of 0.1 dB	Encoder	2.0
EQ Band 4 Frequency	Controls the EQ frequency	Encoder	2.0
EQ Band 4 Bandwidth	Controls the EQ bandwidth	Encoder	2.0
EQ Band 4 Level reset	Sets the EQ level to the band default	Encoder Switch	2.0
EQ Band 4 Frequency reset	Sets the EQ frequency to the band default	Encoder Switch	2.0
EQ Band 4 Bandwidth reset	Sets the EQ bandwidth to the band default	Encoder Switch	2.0
EQ Band 4 Type	Steps through the EQ band types available	Encoder	2.0
EQ Band 5 Level	Controls the EQ level in steps of 0.1 dB	Encoder	2.0
EQ Band 5 Frequency	Controls the EQ frequency	Encoder	2.0
EQ Band 5 Bandwidth	Controls the EQ bandwidth	Encoder	2.0
EQ Band 5 Level reset	Sets the EQ level to the band default	Encoder Switch	2.0
EQ Band 5 Frequency reset	Sets the EQ frequency to the band default	Encoder Switch	2.0
EQ Band 5 Bandwidth reset	Sets the EQ bandwidth to the band default	Encoder Switch	2.0
EQ Band 5 Type	Steps through the EQ band types available	Encoder	2.0
EQ Band 6 Level	Controls the EQ level in steps of 0.1 dB	Encoder	2.0
EQ Band 6 Frequency	Controls the EQ frequency	Encoder	2.0
EQ Band 6 Bandwidth	Controls the EQ bandwidth	Encoder	2.0
EQ Band 6 Level reset	Sets the EQ level to the band default	Encoder Switch	2.0
EQ Band 6 Frequency reset	Sets the EQ frequency to the band default	Encoder Switch	2.0
EQ Band 6 Bandwidth reset	Sets the EQ bandwidth to the band default	Encoder Switch	2.0
EQ Band 6 Type	Steps through the EQ band types available	Encoder	2.0
EQ On/Off	Select the EQ on/off (all bands!)	Switch	2.0
Downward expander threshold	Selects the threshold for the downwards expander in the range from -50 to 0 dB	Encoder, Display	2.1
AGC threshold	Selects the threshold for the AGC (automatic gain control) in the range from -30-0 dB	Encoder, Display	2.1
AGC ratio	Steps through the ratio of AGC (1:1 – 1:25)	Encoder, Display	2.1
Dynamics On/Off	Select the dynamics on/off (dynamics is AGC+Expander)	Switch	2.0
Mono	Makes the module output mono	Switch	2.0
Mono On/Off	Select the Mono on/off	Switch	2.0
Pan	Steps the panning from left to right	Encoder, Display	2.0
Pan reset	Sets the panning to the center	Encoder switch	2.0
Module level	This function handles the fader functionality	Fader	2.0
Module on	This function handles like a on-switch (press = on)	Switch	2.0
Module off	This function handles like a off-switch (press = off)	Switch	2.0
Module on/off	This function handles like a on/off-switch (press = toggle between on and off)	Switch	2.0
Fader and on active	This function shows a ‘1’ if the fader and on are active. When received a ‘1’ the fader and on are activated	Switch, GPIO	2.1

Function name	comments	Example object to connect to	Version
Fader and on inactive	This function shows a '1' if the fader and on are inactive. When received a '1' the fader and on are made inactive.	Switch, GPIO	2.1
Fader and on active/inactive	This function shows a '1' if the fader and on are active. When received a '1' the 'fader and on'-state toggles between active and inactive	Switch, GPIO	2.1
Fader on	This function handles like a fader-on-switch (press = fader at 0 dB)	Switch	2.1
Fader off	This function handles like a fader-off-switch (press = fader is closed)	Switch	2.1
Fader on/off	This function handles like a fader on/off-switch (press = toggle between fader 0 dB and off)	Switch	2.1
Buss 1/2 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 1/2 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 1/2 on	Select the buss on	Switch	2.2
Buss 1/2 off	Select the buss off	Switch	2.2
Buss 1/2 on/off	Select the buss on/off	Switch	2.0
Buss 1/2 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 1/2 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 1/2 balance reset	This resets the balance to the center position	Switch	2.0
Buss 3/4 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 3/4 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 3/4 on	Select the buss on	Switch	2.2
Buss 3/4 off	Select the buss off	Switch	2.2
Buss 3/4 on/off	Select the buss on/off	Switch	2.0
Buss 3/4 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 3/4 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 3/4 balance reset	This resets the balance to the center position	Switch	2.0
Buss 5/6 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 5/6 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 5/6 on	Select the buss on	Switch	2.2
Buss 5/6 off	Select the buss off	Switch	2.2
Buss 5/6 on/off	Select the buss on/off	Switch	2.0
Buss 5/6 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 5/6 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 5/6 balance reset	This resets the balance to the center position	Switch	2.0
Buss 7/8 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 7/8 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 7/8 on	Select the buss on	Switch	2.2
Buss 7/8 off	Select the buss off	Switch	2.2
Buss 7/8 on/off	Select the buss on/off	Switch	2.0
Buss 7/8 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 7/8 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 7/8 balance reset	This resets the balance to the center position	Switch	2.0
Buss 9/10 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 9/10 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 9/10 on	Select the buss on	Switch	2.2
Buss 9/10 off	Select the buss off	Switch	2.2
Buss 9/10 on/off	Select the buss on/off	Switch	2.0
Buss 9/10 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 9/10 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 9/10 balance reset	This resets the balance to the center position	Switch	2.0
Buss 11/12 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 11/12 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 11/12 on	Select the buss on	Switch	2.2
Buss 11/12 off	Select the buss off	Switch	2.2
Buss 11/12 on/off	Select the buss on/off	Switch	2.0
Buss 11/12 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0

Function name	comments	Example object to connect to	Version
Buss 11/12 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 11/12 balance reset	This resets the balance to the center position	Switch	2.0
Buss 13/14 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 13/14 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 13/14 on	Select the buss on	Switch	2.2
Buss 13/14 off	Select the buss off	Switch	2.2
Buss 13/14 on/off	Select the buss on/off	Switch	2.0
Buss 13/14 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 13/14 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 13/14 balance reset	This resets the balance to the center position	Switch	2.0
Buss 15/16 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 15/16 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 15/16 on	Select the buss on	Switch	2.2
Buss 15/16 off	Select the buss off	Switch	2.2
Buss 15/16 on/off	Select the buss on/off	Switch	2.0
Buss 15/16 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 15/16 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 15/16 balance reset	This resets the balance to the center position	Switch	2.0
Buss 17/18 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 17/18 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 17/18 on	Select the buss on	Switch	2.2
Buss 17/18 off	Select the buss off	Switch	2.2
Buss 17/18 on/off	Select the buss on/off	Switch	2.0
Buss 17/18 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 17/18 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 17/18 balance reset	This resets the balance to the center position	Switch	2.0
Buss 19/20 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 19/20 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 19/20 on	Select the buss on	Switch	2.2
Buss 19/20 off	Select the buss off	Switch	2.2
Buss 19/20 on/off	Select the buss on/off	Switch	2.0
Buss 19/20 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 19/20 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 19/20 balance reset	This resets the balance to the center position	Switch	2.0
Buss 21/22 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 21/22 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 21/22 on	Select the buss on	Switch	2.2
Buss 21/22 off	Select the buss off	Switch	2.2
Buss 21/22 on/off	Select the buss on/off	Switch	2.0
Buss 21/22 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 21/22 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 21/22 balance reset	This resets the balance to the center position	Switch	2.0
Buss 23/24 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 23/24 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 23/24 on	Select the buss on	Switch	2.2
Buss 23/24 off	Select the buss off	Switch	2.2
Buss 23/24 on/off	Select the buss on/off	Switch	2.0
Buss 23/24 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 23/24 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 23/24 balance reset	This resets the balance to the center position	Switch	2.0
Buss 25/26 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 25/26 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0

Function name	comments	Example object to connect to	Version
Buss 25/26 on	Select the buss on	Switch	2.2
Buss 25/26 off	Select the buss off	Switch	2.2
Buss 25/26 on/off	Select the buss on/off	Switch	2.0
Buss 25/26 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 25/26 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 25/26 balance reset	This resets the balance to the center position	Switch	2.0
Buss 27/28 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 27/28 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 27/28 on	Select the buss on	Switch	2.2
Buss 27/28 off	Select the buss off	Switch	2.2
Buss 27/28 on/off	Select the buss on/off	Switch	2.0
Buss 27/28 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 27/28 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 27/28 balance reset	This resets the balance to the center position	Switch	2.0
Buss 29/30 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 29/30 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 29/30 on	Select the buss on	Switch	2.2
Buss 29/30 off	Select the buss off	Switch	2.2
Buss 29/30 on/off	Select the buss on/off	Switch	2.0
Buss 29/30 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 29/30 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 29/30 balance reset	This resets the balance to the center position	Switch	2.0
Buss 31/32 level	Controls the sent level to the buss for this module	Encoder, Fader	2.0
Buss 31/32 level reset	Select 'Off 'or 'On = 0 dB' depending on current state	Encoder Switch	2.0
Buss 31/32 on	Select the buss on	Switch	2.2
Buss 31/32 off	Select the buss off	Switch	2.2
Buss 31/32 on/off	Select the buss on/off	Switch	2.0
Buss 31/32 pre	Select if this module sent pre or post fader signal to the buss	Switch	2.0
Buss 31/32 balance	The balance of the module signal sent to the buss	Encoder	2.0
Buss 31/32 balance reset	This resets the balance to the center position	Switch	2.0
Source start	Start (GPO) for current source	Switch	2.0
Source stop	Stop (GPO) for current source	Switch	2.0
Source start/stop	Toggle between start/stop for current source	Switch	2.0
Cough on/off	Toggle between Cough On and Cough off.	GPI, Switch	2.0
Source alert	Do/signal a alert from the selected source	GPI, Switch	2.0
Control	Control 1-4 data value (1-4 depends on console number for this module) The data interpretation depends on the mode of this control (source, gain, aux level etc. etc)	Encoder	2.1
Control label	Set label of the current selected control 1-4 mode (1-4 depends on console number for this module) (Source, gain, aux level etc. etc)	Display	2.1
Control reset	Sets the data to the control 1-4 default value or toggle functions (1-4 depends on console number for this module). The data interpretation depends on the mode of this control (source, gain, aux level etc. etc)	Encoder switch	2.1
Control 1	Control 1 data value The data interpretation depends on the mode of this control 1 (source, gain, aux level etc. etc)	Encoder	2.0
Control 1 label	Set label of the current selected control 1 mode (Source, gain, aux level etc. etc)	Display	2.0
Control 1 reset	Sets the data to the control 1 default value The data interpretation depends on the mode of this control 1 (source, gain, aux level etc. etc)	Encoder switch	2.0
Control 2	Control 2 data value The data interpretation depends on the mode of this control 2 (source, gain, aux level etc. etc)	Encoder	2.0
Control 2 label	Set label of the current selected control 2 mode (Source, gain, aux level etc. etc)	Display	2.0

Function name	comments	Example object to connect to	Version
Control 2 reset	Sets the data to the control 2 default value The data interpretation depends on the mode of this control 2 (source, gain, aux level etc. etc)	Encoder switch	2.0
Control 3	Control 3 data value The data interpretation depends on the mode of this control 3 (source, gain, aux level etc. etc)	Encoder	2.0
Control 3 label	Set label of the current selected control 3 mode (Source, gain, aux level etc. etc)	Display	2.0
Control 3 reset	Sets the data to the control 3 default value The data interpretation depends on the mode of this control 3 (source, gain, aux level etc. etc)	Encoder switch	2.0
Control 4	Control 4 data value The data interpretation depends on the mode of this control 4 (source, gain, aux level etc. etc)	Encoder	2.0
Control 4 label	Set label of the current selected control 4 mode (Source, gain, aux level etc. etc)	Display	2.0
Control 4 reset	Sets the data to the control 4 default value The data interpretation depends on the mode of this control 4 (source, gain, aux level etc. etc)	Encoder switch	2.0
Peak	Shows when this module has a peak in the audio level	LED	2.0
Signal	Shows when audio is received at the module	LED	2.0
Processing preset	With this function you can scroll through all processing presets.	Encoder, Display	2.1
Routing preset 1A	Loads module routing preset 1A	Switch	2.2
Routing preset 1B	Loads module routing preset 1B	Switch	2.2
Routing preset 2A	Loads module routing preset 2A	Switch	2.2
Routing preset 2B	Loads module routing preset 2B	Switch	2.2
Routing preset 3A	Loads module routing preset 3A	Switch	2.2
Routing preset 3B	Loads module routing preset 3B	Switch	2.2
Routing preset 4A	Loads module routing preset 4A	Switch	2.2
Routing preset 4B	Loads module routing preset 4B	Switch	2.2
Talkback 1 to related destination	Switches talkback 1 to all output where the current source its related destination is used.	Switch	2.1
Talkback 2 to related destination	Switches talkback 2 to all output where the current source its related destination is used.	Switch	2.1
Talkback 3 to related destination	Switches talkback 3 to all output where the current source its related destination is used.	Switch	2.1
Talkback 4 to related destination	Switches talkback 4 to all output where the current source its related destination is used.	Switch	2.1
Talkback 5 to related destination	Switches talkback 5 to all output where the current source its related destination is used.	Switch	2.1
Talkback 6 to related destination	Switches talkback 6 to all output where the current source its related destination is used.	Switch	2.1
Talkback 7 to related destination	Switches talkback 7 to all output where the current source its related destination is used.	Switch	2.1
Talkback 8 to related destination	Switches talkback 8 to all output where the current source its related destination is used.	Switch	2.1
Talkback 9 to related destination	Switches talkback 9 to all output where the current source its related destination is used.	Switch	2.1
Talkback 10 to related destination	Switches talkback 10 to all output where the current source its related destination is used.	Switch	2.1
Talkback 11 to related destination	Switches talkback 11 to all output where the current source its related destination is used.	Switch	2.1
Talkback 12 to related destination	Switches talkback 12 to all output where the current source its related destination is used.	Switch	2.1
Talkback 13 to related destination	Switches talkback 13 to all output where the current source its related destination is used.	Switch	2.1
Talkback 14 to related destination	Switches talkback 14 to all output where the current source its related destination is used.	Switch	2.1
Talkback 15 to related destination	Switches talkback 15 to all output where the current source its related destination is used.	Switch	2.1
Talkback 16 to related destination	Switches talkback 16 to all output where the current source its related destination is used.	Switch	2.1
Select 1	When module select for console 1 is activated the current module will be selected for a super module or the EQ window	Switch	2.3
Select 2	When module select for console 2 is activated the current module will be selected for a super module or the EQ window	Switch	2.3

Function name	comments	Example object to connect to	Version
Select 3	When module select for console 3 is activated the current module will be selected for a super module or the EQ window	Switch	2.3
Select 4	When module select for console 4 is activated the current module will be selected for a super module or the EQ window	Switch	2.3
Console	Tells on which console the current module is configured	Selected module indicator	2.3
Audio level left	Left audio level of the module input	Level meter	2.3
Audio level right	Right audio level of the module input	Level meter	2.3
Audio phase	Phase between left and right of the module input	Phase meter	2.3

20.2 Busses

The Axum has 16 stereo busses. For each buss, you are able to connect objects with the following functions:

Function name	comments	Object to connect to	Version
Buss master level	Controls the buss master level	Encoder, Fader	2.0
Buss master level reset	Select 'On and 0 dB'	Encoder switch	2.0
Buss master on/off	Select buss on/off	Switch	2.0
Buss master pre	Switches the total buss pre or post	Switch	2.0
Buss Label	Label of the buss	Display	2.0
Buss Audio level left	Left audio level of the buss	Level meter	2.0
Buss Audio level right	Right audio level of the buss	Level meter	2.0
Buss Audio phase	Phase between buss left/right	Phase meter	2.3
Select 1	When buss select for console 1 is activated the current buss will be selected	meter-selector	2.3
Select 2	When buss select for console 2 is activated the current buss will be selected	meter-selector	2.3
Select 3	When buss select for console 3 is activated the current buss will be selected	meter-selector	2.3
Select 4	When buss select for console 4 is activated the current buss will be selected	meter-selector	2.3
Reset	Resets all routing to this buss	PFL-reset button	2.5
Talkback 1	Switches all destinations to talkback 1 if this buss is the 'signal from' buss	Switch	2.5
Talkback 2	Switches all destinations to talkback 2 if this buss is the 'signal from' buss	Switch	2.5
Talkback 3	Switches all destinations to talkback 3 if this buss is the 'signal from' buss	Switch	2.5
Talkback 4	Switches all destinations to talkback 4 if this buss is the 'signal from' buss	Switch	2.5
Talkback 5	Switches all destinations to talkback 5 if this buss is the 'signal from' buss	Switch	2.5
Talkback 6	Switches all destinations to talkback 6 if this buss is the 'signal from' buss	Switch	2.5
Talkback 7	Switches all destinations to talkback 7 if this buss is the 'signal from' buss	Switch	2.5
Talkback 8	Switches all destinations to talkback 8 if this buss is the 'signal from' buss	Switch	2.5
Talkback 9	Switches all destinations to talkback 9 if this buss is the 'signal from' buss	Switch	2.5
Talkback 10	Switches all destinations to talkback 10 if this buss is the 'signal from' buss	Switch	2.5
Talkback 11	Switches all destinations to talkback 11 if this buss is the 'signal from' buss	Switch	2.5
Talkback 12	Switches all destinations to talkback 12 if this buss is the 'signal from' buss	Switch	2.5
Talkback 13	Switches all destinations to talkback 13 if this buss is the 'signal from' buss	Switch	2.5
Talkback 14	Switches all destinations to talkback 14 if this buss is the 'signal from' buss	Switch	2.5

Function name	comments	Object to connect to	Version
Talkback 15	Switches all destinations to talkback 15 if this buss is the 'signal from' buss	Switch	2.5
Talkback 16	Switches all destinations to talkback 16 if this buss is the 'signal from' buss	Switch	2.5

20.3 Monitor busses

With 4 DSP cards, the Axum will have 16 stereo monitor busses (4 per DSP card).
For each monitor buss, you are able to connect objects to do the following functions:

Function name	Comments	Object to connect to	Version
Buss 1/2 on	Select buss 1/2 for the monitor buss	Switch	2.2
Buss 1/2 off	Deselect buss 1/2 for the monitor buss	Switch	2.2
Buss 1/2 on/off	Toggle buss 1/2 for the monitor buss	Switch	2.0
Buss 3/4 on	Select buss 3/4 for the monitor buss	Switch	2.2
Buss 3/4 off	Deselect buss 3/4 for the monitor buss	Switch	2.2
Buss 3/4 on/off	Toggle buss 3/4 for the monitor buss	Switch	2.0
Buss 5/6 on	Select buss 5/6 for the monitor buss	Switch	2.2
Buss 5/6 off	Deselect buss 5/6 for the monitor buss	Switch	2.2
Buss 5/6 on/off	Toggle buss 5/6 for the monitor buss	Switch	2.0
Buss 7/8 on	Select buss 7/8 for the monitor buss	Switch	2.2
Buss 7/8 off	Deselect buss 7/8 for the monitor buss	Switch	2.2
Buss 7/8 on/off	Toggle buss 7/8 for the monitor buss	Switch	2.0
Buss 9/10 on	Select buss 9/10 for the monitor buss	Switch	2.2
Buss 9/10 off	Deselect buss 9/10 for the monitor buss	Switch	2.2
Buss 9/10 on/off	Toggle buss 9/10 for the monitor buss	Switch	2.0
Buss 11/12 on	Select buss 11/12 for the monitor buss	Switch	2.2
Buss 11/12 off	Deselect buss 11/12 for the monitor buss	Switch	2.2
Buss 11/12 on/off	Toggle buss 11/12 for the monitor buss	Switch	2.0
Buss 13/14 on	Select buss 13/14 for the monitor buss	Switch	2.2
Buss 13/14 off	Deselect buss 13/14 for the monitor buss	Switch	2.2
Buss 13/14 on/off	Toggle buss 13/14 for the monitor buss	Switch	2.0
Buss 15/16 on	Select buss 15/16 for the monitor buss	Switch	2.2
Buss 15/16 off	Deselect buss 15/16 for the monitor buss	Switch	2.2
Buss 15/16 on/off	Toggle buss 15/16 for the monitor buss	Switch	2.0
Buss 17/18 on	Select buss 17/18 for the monitor buss	Switch	2.2
Buss 17/18 off	Deselect buss 17/18 for the monitor buss	Switch	2.2
Buss 17/18 on/off	Toggle buss 17/18 for the monitor buss	Switch	2.0
Buss 19/20 on	Select buss 19/20 for the monitor buss	Switch	2.2
Buss 19/20 off	Deselect buss 19/20 for the monitor buss	Switch	2.2
Buss 19/20 on/off	Toggle buss 19/20 for the monitor buss	Switch	2.0
Buss 21/22 on	Select buss 21/22 for the monitor buss	Switch	2.2
Buss 21/22 off	Deselect buss 21/22 for the monitor buss	Switch	2.2
Buss 21/22 on/off	Toggle buss 21/22 for the monitor buss	Switch	2.0
Buss 23/24 on	Select buss 23/24 for the monitor buss	Switch	2.2
Buss 23/24 off	Deselect buss 23/24 for the monitor buss	Switch	2.2
Buss 23/24 on/off	Toggle buss 23/24 for the monitor buss	Switch	2.0
Buss 25/26 on	Select buss 25/26 for the monitor buss	Switch	2.2
Buss 25/26 off	Deselect buss 25/26 for the monitor buss	Switch	2.2
Buss 25/26 on/off	Toggle buss 25/26 for the monitor buss	Switch	2.0
Buss 27/28 on	Select buss 27/28 for the monitor buss	Switch	2.2
Buss 27/28 off	Deselect buss 27/28 for the monitor buss	Switch	2.2
Buss 27/28 on/off	Toggle buss 27/28 for the monitor buss	Switch	2.0
Buss 29/30 on	Select buss 29/30 for the monitor buss	Switch	2.2
Buss 29/30 off	Deselect buss 29/30 for the monitor buss	Switch	2.2
Buss 29/30 on/off	Toggle buss 29/30 for the monitor buss	Switch	2.0
Buss 31/32 on	Select buss 31/32 for the monitor buss	Switch	2.2
Buss 31/32 off	Deselect buss 31/32 for the monitor buss	Switch	2.2
Buss 31/32 on/off	Toggle buss 31/32 for the monitor buss	Switch	2.0
Ext 1 on	Select Ext 1 for the monitor buss	Switch	2.2
Ext 1 off	Deselect Ext 1 for the monitor buss	Switch	2.2
Ext 1 on/off	Toggle Ext 1 for the monitor buss	Switch	2.0
Ext 2 on	Select Ext 2 for the monitor buss	Switch	2.2
Ext 2 off	Deselect Ext 2 for the monitor buss	Switch	2.2
Ext 2 on/off	Toggle Ext 2 for the monitor buss	Switch	2.0
Ext 3 on	Select Ext 3 for the monitor buss	Switch	2.2
Ext 3 off	Deselect Ext 3 for the monitor buss	Switch	2.2
Ext 3 on/off	Toggle Ext 3 for the monitor buss	Switch	2.0
Ext 4 on	Select Ext 4 for the monitor buss	Switch	2.2
Ext 4 off	Deselect Ext 4 for the monitor buss	Switch	2.2
Ext 4 on/off	Toggle Ext 4 for the monitor buss	Switch	2.0
Ext 5 on	Select Ext 5 for the monitor buss	Switch	2.2

Function name	Comments	Object to connect to	Version
Ext 5 off	Deselect Ext 5 for the monitor buss	Switch	2.2
Ext 5 on/off	Toggle Ext 5 for the monitor buss	Switch	2.0
Ext 6 on	Select Ext 6 for the monitor buss	Switch	2.2
Ext 6 off	Deselect Ext 6 for the monitor buss	Switch	2.2
Ext 6 on/off	Toggle Ext 6 for the monitor buss	Switch	2.0
Ext 7 on	Select Ext 7 for the monitor buss	Switch	2.2
Ext 7 off	Deselect Ext 7 for the monitor buss	Switch	2.2
Ext 7 on/off	Toggle Ext 7 for the monitor buss	Switch	2.0
Ext 8 on	Select Ext 8 for the monitor buss	Switch	2.2
Ext 8 off	Deselect Ext 8 for the monitor buss	Switch	2.2
Ext 8 on/off	Toggle Ext 8 for the monitor buss	Switch	2.0
Mute	Mutes the output	GPO, CRM mute	2.0
Dim	Dims the output	CRM level	2.0
Phones level	Controls the level in steps of 0.1 dB	CRM phones level	2.0
Mono	Mono the output	CRM Mono	2.0
Phase	Phase reverse the right output	CRM Phase	2.0
Speaker level	Controls the level in steps of 0.1 dB	CRM speaker level	2.0
Talkback 1	Talkback to monitor from Talkback 1	Switch	2.0
Talkback 2	Talkback to monitor from Talkback 2	Switch	2.0
Talkback 3	Talkback to monitor from Talkback 3	Switch	2.0
Talkback 4	Talkback to monitor from Talkback 4	Switch	2.0
Talkback 5	Talkback to monitor from Talkback 5	Switch	2.0
Talkback 6	Talkback to monitor from Talkback 6	Switch	2.0
Talkback 7	Talkback to monitor from Talkback 7	Switch	2.0
Talkback 8	Talkback to monitor from Talkback 8	Switch	2.0
Talkback 9	Talkback to monitor from Talkback 9	Switch	2.0
Talkback 10	Talkback to monitor from Talkback 10	Switch	2.0
Talkback 11	Talkback to monitor from Talkback 11	Switch	2.0
Talkback 12	Talkback to monitor from Talkback 12	Switch	2.0
Talkback 13	Talkback to monitor from Talkback 13	Switch	2.0
Talkback 14	Talkback to monitor from Talkback 14	Switch	2.0
Talkback 15	Talkback to monitor from Talkback 15	Switch	2.0
Talkback 16	Talkback to monitor from Talkback 16	Switch	2.0
Audio level left	Left audio level of a monitor buss	Level meter	2.0
Audio level right	Right audio level of a monitor buss	Level meter	2.0
Audio phase	Phase between left and right of a monitor buss	Phase meter	2.3
Label	Name of the monitor buss	Display	2.0
Select 1	When monitor buss select for console 1 is activated the current monitor buss will be selected	meter-selector	2.3
Select 2	When monitor buss select for console 2 is activated the current monitor buss will be selected	meter-selector	2.3
Select 3	When monitor buss select for console 3 is activated the current monitor buss will be selected	meter-selector	2.3
Select 4	When monitor buss select for console 4 is activated the current monitor buss will be selected	meter-selector	2.3

20.4 Console

Console functions are extracted from the the global functions in version engine 2.5.

Function Name	Comments	Object to connect to	Version
Control mode active	Is active when the control mode is shown	EQ Window	2.3
Control mode source	Select mode source for the controllers	Switch	2.0
Control mode processing preset	Select mode processing preset for the controllers	Switch	2.1
Control mode source gain	Select mode source gain for the controllers	Switch	2.0
Control mode source phantom	Select mode phantom for the controllers	Switch	2.1
Control mode source pad	Select mode pad for the controllers	Switch	2.1
Control mode gain	Select mode gain for the controllers	Switch	2.0
Control mode phase	Select mode phase for the controllers	Switch	2.0
Control mode low cut	Select mode low cut for the controllers	Switch	2.0
Control mode Insert on/off	Select mode insert for the controllers	Switch	2.2
Control mode EQ band 1 level	Select mode EQ band 1 level for the controllers	Switch	2.0
Control mode EQ band 1 frequency	Select mode EQ band 1 freq for the controllers	Switch	2.0
Control mode EQ band 1 bandwidth	Select mode EQ band 1 bw for the controllers	Switch	2.0
Control mode EQ band 1 type	Select mode EQ band 1 type for the controllers	Switch	2.0
Control mode EQ band 2 level	Select mode EQ band 2 level for the controllers	Switch	2.0
Control mode EQ band 2 frequency	Select mode EQ band 2 freq for the controllers	Switch	2.0
Control mode EQ band 2 bandwidth	Select mode EQ band 2 bw for the controllers	Switch	2.0
Control mode EQ band 2 type	Select mode EQ band 2 type for the controllers	Switch	2.0
Control mode EQ band 3 level	Select mode EQ band 3 level for the controllers	Switch	2.0
Control mode EQ band 3 frequency	Select mode EQ band 3 freq for the controllers	Switch	2.0
Control mode EQ band 3 bandwidth	Select mode EQ band 3 bw for the controllers	Switch	2.0
Control mode EQ band 3 type	Select mode EQ band 3 type for the controllers	Switch	2.0
Control mode EQ band 4 level	Select mode EQ band 4 level for the controllers	Switch	2.0
Control mode EQ band 4 frequency	Select mode EQ band 4 freq for the controllers	Switch	2.0
Control mode EQ band 4 bandwidth	Select mode EQ band 4 bw for the controllers	Switch	2.0
Control mode EQ band 4 type	Select mode EQ band 4 type for the controllers	Switch	2.0
Control mode EQ band 5 level	Select mode EQ band 5 level for the controllers	Switch	2.0
Control mode EQ band 5 frequency	Select mode EQ band 5 freq for the controllers	Switch	2.0
Control mode EQ band 5 bandwidth	Select mode EQ band 5 bw for the controllers	Switch	2.0
Control mode EQ band 5 type	Select mode EQ band 5 type for the controllers	Switch	2.0
Control mode EQ band 6 level	Select mode EQ band 6 level for the controllers	Switch	2.0
Control mode EQ band 6 frequency	Select mode EQ band 6 freq for the controllers	Switch	2.0
Control mode EQ band 6 bandwidth	Select mode EQ band 6 bw for the controllers	Switch	2.0
Control mode EQ band 6 type	Select mode EQ band 6 type for the controllers	Switch	2.0
Control mode module EQ on/off	Select mode EQ on/off for the controllers	Switch	2.1
Control mode module downward expander threshold	Select mode downward expander threshold	Switch	2.1
Control mode AGC threshold	Select mode AGC threshold	Switch	2.1
Control mode AGC ratio	Select mode AGC ratio for the controllers	Switch	2.0
Control mode Dynamics on/off	Select mode Dynamics on/off for the controllers	Switch	2.2
Control mode mono	Select mode mono for the controllers	Switch	2.0
Control mode pan	Select mode pan for the controllers	Switch	2.0
Control mode module level	Select mode module level for the controllers	Switch	2.0
Control mode buss ½	Select mode buss 1/2 for the controllers	Switch	2.0
Control mode buss 1/2 balance	Select mode buss 1/2 bal. for the controllers	Switch	2.0
Control mode buss 3/4	Select mode buss 3/4 for the controllers	Switch	2.0
Control mode buss 3/4 balance	Select mode buss 3/4 bal. for the controllers	Switch	2.0
Control mode buss 5/6	Select mode buss 5/6 for the controllers	Switch	2.0
Control mode buss 5/6 balance	Select mode buss 5/6 bal. for the controllers	Switch	2.0
Control mode buss 7/8	Select mode buss 7/8 for the controllers	Switch	2.0
Control mode buss 7/8 balance	Select mode buss 7/8 bal. for the controllers	Switch	2.0

Function Name	Comments	Object to connect to	Version
Control mode buss 9/10	Select mode buss 9/10 for the controllers	Switch	2.0
Control mode buss 9/10 balance	Select mode buss 9/10 bal. for the controllers	Switch	2.0
Control mode buss 11/12	Select mode buss 11/12 for the controllers	Switch	2.0
Control mode buss 11/12 balance	Select mode buss 11/12 bal. for the controllers	Switch	2.0
Control mode buss 13/14	Select mode buss 13/14 for the controllers	Switch	2.0
Control mode buss 13/14 balance	Select mode buss 13/14 bal. for the controllers	Switch	2.0
Control mode buss 15/16	Select mode buss 15/16 for the controllers	Switch	2.0
Control mode buss 15/16 balance	Select mode buss 15/16 bal. for the controllers	Switch	2.0
Control mode buss 17/18	Select mode buss 17/18 for the controllers	Switch	2.0
Control mode buss 17/18 balance	Select mode buss 17/18 bal. for the controllers	Switch	2.0
Control mode buss 19/20	Select mode buss 19/20 for the controllers	Switch	2.0
Control mode buss 19/20 balance	Select mode buss 19/20 bal. for the controllers	Switch	2.0
Control mode buss 21/22	Select mode buss 21/22 for the controllers	Switch	2.0
Control mode buss 21/22 balance	Select mode buss 21/22 bal. for the controllers	Switch	2.0
Control mode buss 23/24	Select mode buss 23/24 for the controllers	Switch	2.0
Control mode buss 23/24 balance	Select mode buss 23/24 bal. for the controllers	Switch	2.0
Control mode buss 25/26	Select mode buss 25/26 for the controllers	Switch	2.0
Control mode buss 25/26 balance	Select mode buss 25/26 bal. for the controllers	Switch	2.0
Control mode buss 27/28	Select mode buss 27/28 for the controllers	Switch	2.0
Control mode buss 27/28 balance	Select mode buss 27/28 bal. for the controllers	Switch	2.0
Control mode buss 29/30	Select mode buss 29/30 for the controllers	Switch	2.0
Control mode buss 29/30 balance	Select mode buss 29/30 bal. for the controllers	Switch	2.0
Control mode buss 31/32	Select mode buss 31/32 for the controllers	Switch	2.0
Control mode buss 31/32 balance	Select mode buss 31/32 bal. for the controllers	Switch	2.0
Master control mode buss 1/2	Select mode for the master controllers	Switch	2.0
Master control mode buss 3/4	Select mode for the master controllers	Switch	2.0
Master control mode buss 5/6	Select mode for the master controllers	Switch	2.0
Master control mode buss 7/8	Select mode for the master controllers	Switch	2.0
Master control mode buss 9/10	Select mode for the master controllers	Switch	2.0
Master control mode buss 11/12	Select mode for the master controllers	Switch	2.0
Master control mode buss 13/14	Select mode for the master controllers	Switch	2.0
Master control mode buss 15/16	Select mode for the master controllers	Switch	2.0
Master control mode buss 17/18	Select mode for the master controllers	Switch	2.0
Master control mode buss 19/20	Select mode for the master controllers	Switch	2.0
Master control mode buss 21/22	Select mode for the master controllers	Switch	2.0
Master control mode buss 23/24	Select mode for the master controllers	Switch	2.0
Master control mode buss 25/26	Select mode for the master controllers	Switch	2.0
Master control mode buss 27/28	Select mode for the master controllers	Switch	2.0
Master control mode buss 29/30	Select mode for the master controllers	Switch	2.0
Master control mode buss 31/32	Select mode for the master controllers	Switch	2.0
Master control	Data value of master controllers	Encoder	2.0
Master control reset	Sets master controllers to the default value	Encoder switch	2.0
Reset console to programmed defaults	After pressing one second, console is reset to the programmed defaults	Switch	2.1
Master & control mode buss 1/2	Master control mode & module control mode are switched to buss 1/2	Switch	2.0
Master & control mode buss 3/4	Master control mode & module control mode are switched to buss 3/4	Switch	2.0
Master & control mode buss 5/6	Master control mode & module control mode are switched to buss 5/6	Switch	2.0
Master & control mode buss 7/8	Master control mode & module control mode are switched to buss 7/8	Switch	2.0
Master & control mode buss 9/10	Master control mode & module control mode are switched to buss 9/10	Switch	2.0
Master & control mode buss 11/12	Master control mode & module control mode are switched to buss 11/12	Switch	2.0
Master & control mode buss 13/14	Master control mode & module control mode are switched to buss 13/14	Switch	2.0
Master & control mode buss 15/16	Master control mode & module control mode are switched to buss 15/16	Switch	2.0

Function Name	Comments	Object to connect to	Version
Master & control mode buss 17/18	Master control mode & module control mode are switched to buss 17/18	Switch	2.0
Master & control mode buss 19/20	Master control mode & module control mode are switched to buss 19/20	Switch	2.0
Master & control mode buss 21/22	Master control mode & module control mode are switched to buss 21/22	Switch	2.0
Master & control mode buss 23/24	Master control mode & module control mode are switched to buss 23/24	Switch	2.0
Master & control mode buss 25/26	Master control mode & module control mode are switched to buss 25/26	Switch	2.0
Master & control mode buss 27/28	Master control mode & module control mode are switched to buss 27/28	Switch	2.0
Master & control mode buss 29/30	Master control mode & module control mode are switched to buss 29/30	Switch	2.0
Master & control mode buss 31/32	Master control mode & module control mode are switched to buss 31/32	Switch	2.0
Console preset label	Returns the name of the last used preset on the console	Display	2.0
Module select	Function to select a module on the console	Module select encoder	2.3
Selected module active	Is active for 10 seconds when a module parameter is changed	Show module parameters	2.5
Buss select	Function to select a buss on the console	buss select encoder	2.3
Selected buss active	Is active for 10 seconds when a buss parameter is changed	Show buss parameters	2.5
Monitor buss select	Function to select a monitor buss on the console	monitor buss select encoder	2.3
Selected monitor buss active	Is active for 10 seconds when a monitor buss parameter is changed	Show mon buss parameters	2.5
Source select	Function to select a source the console	source select encoder	2.3
Selected source active	Is active for 10 seconds when a source parameter is changed	Show source parameters	2.5
Destination select	Function to select a destination on the console	destination select encoder	2.3
Selected destination active	Is active for 10 seconds when a destination parameter is changed	Show dest parameters	2.5
Console chipcard change	Function to detect insertion of a chipcard	chipcard switch	2.3
Console chipcard username	Function to connect to the physical chipcard objects in a surface	chipcard username	2.3
Console chipcard password	Function to connect to the physical chipcard objects in a surface	chipcard password	2.3
Console write chipcard user/pass	Function to connect to the physical chipcard objects in a surface	-	2.3
Console username	Function that updates if the console username on a change.	external application	2.3
Console password	Function that updates if the console password on a change.	external application	2.3
Console username/password	Function that updates on account changes or may set the account of the console	external application	2.3
Console user level	May be used to set the user level of the console, it also updates when the user level of the console has been changed	external application	2.3
Second dot count up/down	This function makes it possibly to make de clock second dots change from count up to count down	Clock application	2.5
Program end time enable	The program end time may be displayed in the clock if enabled.	Clock application	2.5
Program end time hours	This function may be used to set the hour value of the program end time.	Clock application	2.5
Program end time minutes	This function may be used to set the minute value of the program end time.	Clock application	2.5
Program end time seconds	This function may be used to set the second value of the program end time.	Clock application	2.5
Count down timer	This function may be used to set the count down timer which may be shown in the clock application	Clock application	2.5

20.5 Global

It will be possible to have the following global sensor change receivers:

Function Name	Comments	Object to connect to	Version
Red-light 1	Activate the red-light 1 buss	Switch, GPO	2.0
Red-light 2	Activate the red-light 2 buss	Switch, GPO	2.0
Red-light 3	Activate the red-light 3 buss	Switch, GPO	2.0
Red-light 4	Activate the red-light 4 buss	Switch, GPO	2.0
Red-light 5	Activate the red-light 5 buss	Switch, GPO	2.0
Red-light 6	Activate the red-light 6 buss	Switch, GPO	2.0
Red-light 7	Activate the red-light 7 buss	Switch, GPO	2.0
Red-light 8	Activate the red-light 8 buss	Switch, GPO	2.0
Console preset 1	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 2	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 3	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 4	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 5	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 6	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 7	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 8	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 9	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 10	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 11	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 12	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 13	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 14	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 15	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 16	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 17	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 18	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 19	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1

Function Name	Comments	Object to connect to	Version
Console preset 20	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 21	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 22	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 23	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 24	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 25	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 26	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 27	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 28	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.1
Console preset 29	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.0
Console preset 30	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.0
Console preset 31	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.0
Console preset 32	After one second recalls the preset on-air safe. After three seconds it forces the on-air channels to recall.	Switch	2.0
Initialization status	This function gives information on the Initialization status used by progress bars that may be displayed at boot time.	Progress bar	2.5

20.6 Sources

Some objects have functionalities that relate to the source selected on a module. For example if you have a GPI that needs to trigger a CUE or Alert module function. In addition, a GPO can have a relation to the fader on/off of the module where its source is connected.
This group with source functions makes it possible to have source related module functionality:

Name	comments	Example object to connect to	Version
Module on	connect to the module(s) on if this source is selected	GPIO	2.0
Module off	connect to the module(s) off if this source is selected	GPIO	2.0
Module on/off	connect to the module(s) on/off if this source is selected	GPIO	2.0
Module fader on	connect to the module(s) fader on if this source is selected	GPIO	2.0
Module fader off	connect to the module(s) fader off this source is selected	GPIO	2.0
Module fader on/off	connect to the module(s) fader on/off this source is selected	GPIO	2.0
Module fader and on active	connect to the module(s) fader on and on if this source is selected	GPIO	2.0
Module fader and on inactive	connect to the module(s) fader on and on if this source is selected	GPIO	2.0
Module fader and on active/inactive	connect to the module(s) fader on and on if this source is selected	GPIO	2.2
Module buss 1/2 on	connect to the module(s) buss 1/2 on if this source is selected	GPIO	2.0
Module buss 1/2 off	connect to the module(s) buss 1/2 off if this source is selected	GPIO	2.0
Module buss 1/2 on/off	connect to the module(s) buss 1/2 on/off if this source is selected	GPIO	2.0
Module buss 3/4 on	connect to the module(s) buss 3/4 on if this source is selected	GPIO	2.0

Name	comments	Example object to connect to	Version
Module buss 3/4 off	connect to the module(s) buss 3/4 off if this source is selected	GPIO	2.0
Module buss 3/4 on/off	connect to the module(s) buss 3/4 on/off if this source is selected	GPIO	2.0
Module buss 5/6 on	connect to the module(s) buss 5/6 on if this source is selected	GPIO	2.0
Module buss 5/6 off	connect to the module(s) buss 5/6 off if this source is selected	GPIO	2.0
Module buss 5/6 on/off	connect to the module(s) buss 5/6 on/off if this source is selected	GPIO	2.0
Module buss 7/8 on	connect to the module(s) buss 7/8 on if this source is selected	GPIO	2.0
Module buss 7/8 off	connect to the module(s) buss 7/8 off if this source is selected	GPIO	2.0
Module buss 7/8 on/off	connect to the module(s) buss 7/8 on/off if this source is selected	GPIO	2.0
Module buss 9/10 on	connect to the module(s) buss 9/10 on if this source is selected	GPIO	2.0
Module buss 9/10 off	connect to the module(s) buss 9/10 off if this source is selected	GPIO	2.0
Module buss 9/10 on/off	connect to the module(s) buss 9/10 on/off if this source is selected	GPIO	2.0
Module buss 11/12 on	connect to the module(s) buss 11/12 on if this source is selected	GPIO	2.0
Module buss 11/12 off	connect to the module(s) buss 11/12 off if this source is selected	GPIO	2.0
Module buss 11/12 on/off	connect to the module(s) buss 11/12 on/off if this source is selected	GPIO	2.0
Module buss 13/14 on	connect to the module(s) buss 13/14 on if this source is selected	GPIO	2.0
Module buss 13/14 off	connect to the module(s) buss 13/14 off if this source is selected	GPIO	2.0
Module buss 13/14 on/off	connect to the module(s) buss 13/14 on/off if this source is selected	GPIO	2.0
Module buss 15/16 on	connect to the module(s) buss 15/16 on if this source is selected	GPIO	2.0
Module buss 15/16 off	connect to the module(s) buss 15/16 off if this source is selected	GPIO	2.0
Module buss 15/16 on/off	connect to the module(s) buss 15/16 on/off if this source is selected	GPIO	2.0
Module buss 17/18 on	connect to the module(s) buss 17/18 on if this source is selected	GPIO	2.0
Module buss 17/18 off	connect to the module(s) buss 17/18 off if this source is selected	GPIO	2.0
Module buss 17/18 on/off	connect to the module(s) buss 17/18 on/off if this source is selected	GPIO	2.0
Module buss 19/20 on	connect to the module(s) buss 19/20 on if this source is selected	GPIO	2.0
Module buss 19/20 off	connect to the module(s) buss 19/20 off if this source is selected	GPIO	2.0
Module buss 19/20 on/off	connect to the module(s) buss 19/20 on/off if this source is selected	GPIO	2.0
Module buss 21/22 on	connect to the module(s) buss 21/22 on if this source is selected	GPIO	2.0
Module buss 21/22 off	connect to the module(s) buss 21/22 off if this source is selected	GPIO	2.0
Module buss 21/22 on/off	connect to the module(s) buss 21/22 on/off if this source is selected	GPIO	2.0
Module buss 23/24 on	connect to the module(s) buss 23/24 on if this source is selected	GPIO	2.0
Module buss 23/24 off	connect to the module(s) buss 23/24 off if this source is selected	GPIO	2.0
Module buss 23/24 on/off	connect to the module(s) buss 23/24 on/off if this source is selected	GPIO	2.0
Module buss 25/26 on	connect to the module(s) buss 25/26 on if this source is selected	GPIO	2.0
Module buss 25/26 off	connect to the module(s) buss 25/26 off if this source is selected	GPIO	2.0
Module buss 25/26 on/off	connect to the module(s) buss 25/26 on/off if this source is selected	GPIO	2.0
Module buss 27/28 on	connect to the module(s) buss 27/28 on if this source is selected	GPIO	2.0
Module buss 27/28 off	connect to the module(s) buss 27/28 off if this source is selected	GPIO	2.0
Module buss 27/28 on/off	connect to the module(s) buss 27/28 on/off if this source is selected	GPIO	2.0
Module buss 29/30 on	connect to the module(s) buss 29/30 on if this source is selected	GPIO	2.0
Module buss 29/30 off	connect to the module(s) buss 29/30 off if this source is selected	GPIO	2.0
Module buss 29/30 on/off	connect to the module(s) buss 29/30 on/off if this source is selected	GPIO	2.0
Module buss 31/32 on	connect to the module(s) buss 31/32 on if this source is selected	GPIO	2.0
Module buss 31/32 off	connect to the module(s) buss 31/32 off if this source is selected	GPIO	2.0
Module buss 31/32 on/off	connect to the module(s) buss 31/32 on/off if this source is selected	GPIO	2.0
Module cough on/off	connect to the module(s) Cough if this source is selected	GPI	2.0
Cough & Comm technician	Mutes this source to all busses, except of the Comm technician buss. This makes it possible to have comminucation and cough	GPI	2.5
Cough & Comm producer	Mutes this source to all busses, except of the Comm producer buss. This makes it possible to have comminucation and cough	GPI	2.5
Start	Start function for the corresponding source	GPO	2.0
Stop	Stop function for the corresponding source	GPO	2.0
Start/Stop	Start function for the corresponding source	GPO	2.0
Phantom	Phantom function for the corresponding source	Phantom/GPO	2.0
Pad	PAD function for the corresponding source	Pad/GPO	2.0
Input gain	(Analog) gain for the corresponding source	Gain	2.0
Alert	Alert from the corresponding source	GPI	2.0
Select 1	When source select for console 1 is activated the source will be selected	future use	2.3

Name	comments	Example object to connect to	Version
Select 2	When source select for console 2 is activated the source will be selected	future use	2.3
Select 3	When source select for console 3 is activated the source will be selected	future use	2.3
Select 4	When source select for console 4 is activated the source will be selected	future use	2.3

20.7 Destinations

Some objects have functionality that relates to the destination selected on a send module. For example if you have a GPI that should trigger a TB or MUTE send module function.
This group with destination functions makes it possible to have destination related send module functionality:

Name	Comments	Example object to connect to	Version
Label	Shows the name of the current destination	Display	2.0
Source	Selects the source for this destination	Encoder/Display	2.0
Monitor speaker level	If the source is a monitor buss and the speaker level is changed this destination will follow	I/O card level	2.0
Monitor phones level	If the source is a monitor buss and the phones level is changed this destination will follow	I/O card level	2.0
Level	This adjust the level of this destination	Encoder	2.0
Mute	Mutes this destination	Switch, I/O card mutes	2.0
Mute & Monitor mute	Mutes this destination if the source is a monitor buss and the monitor buss mute is activated or its local mute is set.	I/O card mutes	2.0
Dim	Dims this destination	Switch, I/O card dim	2.0
Dim & Monitor dim	Dims this destination if the source is a monitor buss and the monitor buss dim is activated or its local dim is set.	I/O card dim	2.0
Mono	Make this destination mono	Switch, I/O card mono	2.0
Mono & Monitor mono	Make this destination mono if the source is a monitor buss and the monitor buss mono is activated or its local mono is set.	I/O card mono	2.0
Phase	Changes phase for this destination	Switch, I/O card phase	2.0
Phase & Monitor phase	Changes phase for this destination if the source is a monitor buss and the monitor buss phase is activated or its local phase is set.	I/O card phase	2.0
Talkback 1	Do talkback to this destination	Switch, I/O card talkback 1	2.0
Talkback 1 & Monitor talkback 1	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 1	2.0
Talkback 2	Do talkback to this destination	Switch, I/O card talkback 2	2.0
Talkback 2 & Monitor talkback 2	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 2	2.0
Talkback 3	Do talkback to this destination	Switch, I/O card talkback 3	2.0
Talkback 3 & Monitor talkback 3	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 3	2.0
Talkback 4	Do talkback to this destination	Switch, I/O card talkback 4	2.0
Talkback 4 & Monitor talkback 4	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 4	2.0
Talkback 5	Do talkback to this destination	Switch, I/O card talkback 5	2.0
Talkback 5 & Monitor talkback 5	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 5	2.0
Talkback 6	Do talkback to this destination	Switch, I/O card talkback 6	2.0
Talkback 6 & Monitor talkback 6	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 6	2.0
Talkback 7	Do talkback to this destination	Switch, I/O card talkback 7	2.0

Name	Comments	Example object to connect to	Version
Talkback 7 & Monitor talkback 7	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 7	2.0
Talkback 8	Do talkback to this destination	Switch, I/O card talkback 8	2.0
Talkback 8 & Monitor talkback 8	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 8	2.0
Talkback 9	Do talkback to this destination	Switch, I/O card talkback 9	2.0
Talkback 9 & Monitor talkback 9	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 9	2.0
Talkback 10	Do talkback to this destination	Switch, I/O card talkback 10	2.0
Talkback 10 & Monitor talkback 10	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 10	2.0
Talkback 11	Do talkback to this destination	Switch, I/O card talkback 11	2.0
Talkback 11 & Monitor talkback 11	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 11	2.0
Talkback 12	Do talkback to this destination	Switch, I/O card talkback 12	2.0
Talkback 12 & Monitor talkback 12	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 12	2.0
Talkback 13	Do talkback to this destination	Switch, I/O card talkback 13	2.0
Talkback 13 & Monitor talkback 13	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 13	2.0
Talkback 14	Do talkback to this destination	Switch, I/O card talkback 14	2.0
Talkback 14 & Monitor talkback 14	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 14	2.0
Talkback 15	Do talkback to this destination	Switch, I/O card talkback 15	2.0
Talkback 15 & Monitor talkback 15	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 15	2.0
Talkback 16	Do talkback to this destination	Switch, I/O card talkback 16	2.0
Talkback 16 & Monitor talkback 16	Do talkback to this destination if the source is a monitor buss and the monitor buss talkback is activated or its local talkback is set.	I/O card talkback 16	2.0
Routing	Makes it possible to select which channels are going to this destination. The options are Left, Right, Stereo	Encoder, Display	2.1
Select 1	When destination select for console 1 is activated the destination will be selected	future use	2.3
Select 2	When destination select for console 2 is activated the destination will be selected	future use	2.3
Select 3	When destination select for console 3 is activated the destination will be selected	future use	2.3
Select 4	When destination select for console 4 is activated the destination will be selected	future use	2.3